

THE DOCK & HARBOUR AUTHORITY

No. 145. Vol. XIII.

NOVEMBER, 1932

Editorial

The Port of Portland, Oregon, U.S.A.

The Port of Portland, which is one of the major ports of the United States and the principal port of the Pacific North-West, is located on the Willamette River in the State of Oregon, a distance of 96 nautical miles from the sea.

Both the City and Port of Portland since their beginning have passed through steady stages of growth and development, which has given Portland the substantial port and city that it has to-day.

The fresh water harbour at Portland, formed by the Willamette River near its junction with the Columbia River, has a frontage of approximately 27 miles. It is free from any but slight tidal fluctuations, has a low water depth of 35-ft. practically throughout, a width of from 900 to 1,600-ft. and provides 7 miles of berthing space for deep-sea vessels.

The waterside facilities of the harbour, which are mostly modern, include public and private terminals, oil, lumber and grain wharves, shipside warehouses, lumber and flour mills, elevators, bunkers, dry docks and shipyards, and these facilities amply cater for every shipping need and afford ample accommodation for the huge volume of the port's waterborne commerce.

The Port of Portland is served by two organisations, both of which have partial jurisdiction over the harbour. These two organisations are known as the Port of Portland Commission and the Commission of Public Docks.

The Port of Portland Commission, apart from its principal duties in relation to harbour and channel improvements and maintenance, conducts a river towage service and owns and operates two fully-equipped dry docks. The first of these is of 10,000 tons dead weight lifting capacity, is 468-ft. in length with a width between wings of 82-ft. and a depth over keel blocks of 25-ft.

The second dry dock has a lifting capacity of 15,000 tons, is 492-ft. in length, 94-ft. wide and has a water depth over keel blocks of 27-ft.

The Commission of Public Docks was created in 1911 and has jurisdiction over the entire water front of the City of Portland and also owns, maintains and operates three public terminals, two of which are general cargo terminals and the other, which is the largest on the Pacific Coast, has in addition to general cargo facilities, 10,000 tons capacity coal bunkers with car tipper and conveyors, a grain elevator with a capacity of 2,000,000 bushels and bulk vegetable oil tanks having a capacity of 1,486,800 gallons.

Regarding the statistics for the port, the water-borne commerce for 1931 included 2,704,364 tons of imports with a value of \$149,441,069 and exports totalled 2,138,936 tons with a value of \$80,362,159. These figures, together with the amount of local inland water traffic, gave a total of exports and imports of 8,593,888 tons with a value of \$256,556,825.

The number and net tonnage of vessels entering and clearing at Portland in the year 1931 was—entered 1,872 vessels with a net tonnage of 5,468,217 and cleared 1,863 vessels with a net tonnage of 5,423,922.

For the financial year ended November 30th, 1931, the Port of Portland received in revenue \$643,583.98, this showing a balance over expenses of \$189,611.02 on the year's working.

An illustrated article on the Port of Portland and its development appears on another page and also forms the supplement for this month's issue.

Proposed Improvements at Stornoway Harbour.

Stornoway Harbour Commissioners—as the result of further correspondence—have received the approval of the Ministry of Transport to the borrowing of the sum of £18,000 for the execution of the proposed improvement work to Cromwell Street Quay

subject to the completion of this work to the satisfaction of the Fishery Board for Scotland. This loan has to be advanced by the Public Works Loan Board on the completion of the works, and has to be repaid with interest at 5½ per cent. per annum in 30 years. It has been resolved to accept this loan on the conditions and terms laid down by the Public Works Loan Commissioners, and the work in question will now be immediately proceeded with. It is anticipated that the consulting engineers will visit Stornoway on an early date for the purpose of meeting with the Commissioners and making the necessary arrangements for the commencement of the work.

Completion of First Section of Deep Water Quay Wall on Dock Extension Scheme at Southampton.

October has seen the completion of the first section of the deep water quay wall constructed on the Western Shore at Southampton, in connection with the Southern Railway Company's dock extension scheme. The new quay wall has been completed to cope or quay level for over 3,000-ft., and on October 19th the Cunard liner "Mauretania," which for so many years held the blue riband of the Atlantic, had the distinction of being the first vessel to be berthed alongside the completed section of the quay.

The "Mauretania" was due to remain in port for several weeks, and in order that the Ocean Dock might be left free for the ships in commission, the Cunarder moved to the new berth.

The passenger and cargo sheds and other equipment on this part of the quay are not quite ready to be used for the discharging of a ship in active service, but the two sheds, which combined have a length of 1,670-ft. and a width of 150-ft., are fast nearing completion.

Four of the electric cranes on the quayside are already in position. The second stage of the extension scheme, which provides for another 3,500-ft. of quay wall work, has progressed to the extent that 34 of 68 monoliths which have to be sunk have reached their full depth. Others are in process of sinking, so that 3,300-ft. of the wall is under construction.

The dredging of the approach channel was, of course, completed before the "Mauretania" moved alongside. The deepening to 45-ft. l.w.o.s.t. alongside the new berth has been completed for 3,400-ft.

The work on the new graving dock is proceeding according to schedule, and excavation and concreting work are being undertaken simultaneously. The south-east entrance and walls have been completed to quay level. The walls, which are of concrete, are 77-ft. in height from foundation to quay level.

On the land reclaimed in connection with the extension scheme work is shortly to be started on the building of a large flour mill. This is the first of several new factories which, it is expected, will be erected on the reclaimed land.

Returns of Hull Docks still show a Decrease on Last Year.

Owing to seasonal influences there has been a certain amount of activity of late at the Hull docks, but on the whole the volume of overseas trade—export, import and re-export—is much behind that of last year. To the end of September the imports of wheat and kindred cereals were just over 881,000 tons, as compared with 1,060,500 tons in the corresponding nine months of 1931, and of oil seeds, nuts and kernels required by another of Hull's leading industries, 421,130 tons, against 457,250 tons. At the same time imports of sawn wood and pit props are down 161,000 loads. A decrease in volume of over 378,000 tons in the three leading imports is a serious loss to the dock authorities. In addition, there has been a big fall in the quantity of coal exported and general merchandise handled—all contributing to reduced earnings of both docks and railways.

Scottish Harbour Notes

Clyde Navigation Trust.

TRADE and shipping at the harbour have been quiet on both imports and exports, and there seems but little indication of the present depression in the West of Scotland lifting. At the last meeting of the Clyde Navigation Trustees the Traffic Committee submitted its fourth supplementary report regarding tariff charges for master portorage at Glasgow Harbour, which contained a list of proposed charges for approval and regulation by the Trust as from October 17th, 1932, covering a miscellaneous list of traffics.

It was also reported that an arrangement had been arrived at with the Chief Constable of Glasgow for the more satisfactory policing of Glasgow Harbour.

Wick Harbour Revenue shows an Increase.

Hopes that conditions had changed for the better were expressed at a meeting of Wick Harbour Trustees when the latest revenue figures were announced. It was reported that the revenue for the ten months of the current financial year amounted to £11,207, as against £8,520 for the same period last year, and great gratification was expressed at this happy state of affairs. Increased herring landings, it was intimated, were primarily responsible for this substantial increase in revenue. Commenting on these figures, Provost Duchart (Chairman of the Trustees) said there had been a period earlier in the year when things had been looking very dull and black, but there was every hope that conditions had now permanently changed for the better. It was further intimated that there would be no necessity to claim from the local Town Council funds to meet current liabilities, as the revenue for the year was now expected to yield a surplus of over £2,250. Intimation was also made that the work had been re-commenced of re-facing the harbour quay with steel piling and concrete.

Anstruther Union Harbour Improvements.

According to a report given to the Commissioners of Anstruther (Fifeshire) Union Harbour, no decision has yet been received from the Fishery Board with regard to the levelling of the harbour bottom of the west breakwater, and the Commis-

sioners felt it was necessary that this matter should be immediately decided in order that the contractor might utilise his plant before removing same. The view was expressed at a meeting of the Commissioners that this work was absolutely essential, and that it would be regrettable if, after spending so much money improving the pier—boats could not make proper use of it. The Commissioners accordingly unanimously resolved to instruct the contractor to proceed with the work in view of its importance, and it was agreed to ascertain from the Burgh Surveyor the probable cost of tar surfacing the east half of the middle pier.

Nairn Harbour Works Proceeding Satisfactorily.

Messrs. Henderson and Nicol, the well-known Aberdeen civil engineers, have reported that the weather has recently been very favourable for the carrying on of work at the new drifter basins at Nairn Harbour. The groynes continue to function satisfactorily and the Fishery Board dredger has taken a large quantity of material from the channel. Other work referred to in the report consists of reconditioning the piers of the old harbour and fixing fenders at the basin. With regard to the protection of the foreshore it is intimated that the concrete groyne has been completed for about half its length, and that the work is proceeding satisfactorily. Stones have been placed on the embankment from the fourth groyne to the concrete groyne, and there has already been an accumulation of sand between these groynes.

Rothsay Harbour Trust.

It is indicated in the annual accounts of Rothsay Harbour Trust that the income for the past year amounted to £7,120, as compared with £7,062 last year; while the total expenditure was £6,725 as compared with £6,615 last year. It is further intimated that the revenue from vessels using the harbour totalled £3,397, while £2,914 was received in turnstile dues from passengers. The debt on the local harbour is now £2,457, which is off-set by stock and bonds valued at £5,025, the balance of assets over liabilities being £43,445.

Port of Southampton Topics

Dock Statistics for September still show Decreases.

Southampton Dock statistics for September show several considerable decreases, but, generally speaking, are not so discouraging as the figures for previous months.

Vessels inward dropped by 23, from 340 to 317, whilst outward there was a decline of 11 vessels, 326 to 315.

Gross tonnage inward fell from 1,668,130 tons to 1,606,297 tons, and outward from 1,633,645 tons to 1,566,780 tons, resulting in a decline of 61,833 tons, and 66,865 tons respectively. The net tonnage showed a drop of 17,286 tons inward and 18,535 tons outward, the actual figures being 850,220 tons, as against 867,506 tons inward, and 833,485 tons as compared with 852,020 tons outward.

In the passenger movements there was a decrease of some 2,300 in the inward and outward total. Inward there was a drop of 5,356, from 41,244 to 35,888, and outward an increase of 3,065—from 32,022 to 35,087.

The number of troops handled in the docks during the month was less than in the corresponding period last year, the total outward being 3,063, as compared with 4,138, a drop of 1,075.

For the first time for many months there was an increase in the volume of cargo handled in the port. While imports declined by 171 tons, exports increased by 1,347 tons. That is gratifying in view of the general situation. The imports amounted to 53,698 tons, as compared with 53,869 tons in the corresponding month last year, and exports were 29,659 tons, as against 28,312 tons.

Big Ocean Liners Commence Laying-up.

The past month has seen the beginning of the laying up of the big ocean liners at Southampton, and from now onwards until April the overhaul of the vessels will continue.

As far as can be ascertained there will be nine ocean-going liners laying up here this winter. Though it is true that the North Atlantic trade during the summer has turned out better

than was anticipated in the spring, the season was far from satisfactory, and the overhauls will be as inexpensive as is consistent with keeping the vessels in proper condition.

The first two liners to lay up, the Canadian Pacific Company's "Empress of Australia" and "Empress of Britain," began their lay-up in the middle of the month, and the White Star liner "Homeric" followed soon after for a two months' rest.

In November the "Aquitania" and the "Olympic" will pass into the hands of the ship repairers, and in December the Canadian Pacific "Duchess of Richmond" will be overhauled before starting on a cruise. In the New Year the "Mauretania," "Berengaria," and "Majestic" will all be laying up for overhaul.

It is interesting to note in connection with the overhaul of the "Empress of Britain" that that liner has in the past five months made 20 voyages between Southampton and Quebec and steamed 56,711 miles, bringing her total since leaving her builders in the spring of 1931 to 236,711 miles. During the past season she carried 11,372 passengers and 45,481 bags of mail. The vessel is easily the speediest on the Canadian service. After her overhaul the "Empress of Britain" will go on a world cruise.

Record Passenger Traffic on Channel Islands Route.

The summer of 1932 has established a new record in the number of passengers between Southampton and the Channel Islands. In the period from June to September the Southern Railway Company's steamers transported to and from the Channel Islands 138,021 passengers. This figure was 12,259 and 16,239 greater respectively than the totals for 1931 and 1930.

There was a falling off of 70 per cent, in the number of passengers on the St. Malo service compared with last year, and in freight on the French services there was a big decrease. In consequence the company stopped their service to Honfleur, which had existed for 80 years.

Italian Harbour Affairs

ACCORDING to statistics which have been published by the Istituto Centrale di Statistica, the following is a schedule of the main items of imports at the leading Italian harbours during the period from January to August, 1932:—

	COAL		CEREALS		COTTON	
	1932	1931	1932	1931	1932	1931
	TONS					
Genova	1,414,810	1,719,463	543,171	712,123	108,935	80,925
Savona	722,501	809,547	1,828	821	55	345
Leghorn	406,776	433,824	57,238	68,320	1,999	1,010
Civitavecchia	364,191	407,619	47,728	51,872	—	—
Naples	416,836	488,146	230,040	325,314	5,244	4,373
Palermo	74,375	117,327	406	10,493	—	—
Catania	31,680	79,889	39,526	62,270	—	—
Trieste*	269,323	266,517	72,012	43,582	23,976	27,391
Fiume	13,406	30,584	17,031	5,969	1,366	876
Venice	579,642	788,874	228,926	149,313	33,024	26,503
Ancona	98,359	220,928	138,023	26,234	—	—
Bari	61,865	68,699	53,082	58,474	—	—

* January—June, 1932 & 1931

Imports of coal continue to show a drop at all Italian ports with the exception of Trieste, where there has been a slight increase. The largest decreases are at Genoa (300,000 tons) and at Venice (200,000 tons), whereas at smaller ports the decline in the coal imports has been practically negligible. The imports of cereals have shown, instead, a decline at all ports on the west coast of Italy, while increases are noticed at Adriatic ports. The arrivals of cotton have shown an increase at all Italian ports, with the exception of Trieste.

An additional allowance of 50 million lire has been made by the Italian Government in order to facilitate the completion of the Port of Bengazi, while the whole position of harbour enlargements which are being carried out at Fiume will have to be reviewed, taking into consideration slidings, which have taken place in the construction of new quayage.

It should be noted that in addition to the activities of the Italian Government to improve harbour facilities, private enterprises are also showing great interest in this respect, as is seen from the fact that Genoese and Venetian interests have created the Società Rimorchiatori Riuniti di Venezia to handle towage services at that port, and the Società Veneziana Esercizio Bacini for the operation of the dry docks, among which there is a dry dock 200 metres long, this being the second largest in the Mediterranean, the 280 metres dry dock of the S.A. Ente Bacini at Genoa being the biggest.

The development of shipping at Trieste during September and the first nine months of 1932 is summarised as follows:—

		September	
		1932 Centals	1931 Centals
ARRIVALS			
By rail	...	391,969	621,297
By sea	...	1,187,154	1,960,481
	Total	1,579,123	2,581,778
CLEARANCES			
By rail	...	590,083	1,113,212
By sea	...	394,968	517,980
	Total	965,051	1,631,192
TOTAL			
By rail	...	972,052	1,734,509
By sea	...	1,572,122	2,478,461
	Total	2,544,174	4,212,970

		January—September	
		1932 Centals	1931 Centals
ARRIVALS			
By rail	...	3,792,416	5,651,945
By sea	...	12,156,375	12,961,262
	Total	15,948,691	19,613,207
CLEARANCES			
By rail	...	6,324,701	9,325,205
By sea	...	3,632,031	4,523,128
	Total	9,956,732	12,848,333
TOTAL			
By rail	...	10,117,117	13,977,150
By sea	...	15,788,306	17,484,390
	Total	25,905,423	31,461,540

It should be noted that while railway traffic has shown, during the whole period from January to September, a decrease of 3,860,033 centals, shipping has shown a decrease of 1,696,084 centals, thus showing that the depression in traffic at Trieste is more than anything else the result of the economic crisis in Central Europe.

According to information from Venice it appears that the amount of 50 million lire has been spent in order to increase the depth of water, both in the Port of Venice and in the Marghera Docks, in order to facilitate the manœuvring of large ships. In the Marghera Docks the length of the canals connecting them to the Port of Venice, and respectively to the Adriatic ports, is now 11 kilometres. Furthermore, an allowance of 10,550,000 lire has been granted to complete the breakwaters of the canal of the Port of Chiozza; 8,445,000 lire have

been allotted to build new quayage in the "Stazione Marittima" of the Port of Venice; 12,391,000 lire to build new warehousing facilities; and 11,500,000 lire to enlarge the unloading and loading facilities in the Port of Venice.

The success of the works is shown by the fact that large ships such as the "Saturnia" and "Vulcania" (22,500 gross tons) and the "Neptunia" and "Oceania" (20,000 gross tons) of the Cosulich, Società Triestina di Navigazione, are now undertaking operations alongside the quay at Venice, when a few years ago they did not even enter the San Marco Basin.

The question of exploiting the position of the Port of Ravenna in respect to certain industrial regions of Central Italy is again being considered, and Premier Mussolini has recently visited that harbour in order to ascertain the possibilities existing there. In the meantime the depth of the Candiano Canal connecting Ravenna to the Adriatic has been increased, and dredgers are still working uninterruptedly, while large steamers engaged in trans-Atlantic services have called there, unloading directly on to the quay. The question of building an oil dock in the Port of Bari is again being considered, since it has been decided that the Azienda Generale Italiana Petroli (A.G.I.P.) will erect a large new oil refinery there.

The Bridges Department of the Cantieri Riuniti dell'Adriatico at Trieste has just delivered to the Organismo Limenos Pireos two electric coal elevators of a power of 50 tons hourly. It would appear that the Italian firms are to build unloading facilities, both for Greek as well as for Portuguese harbours, besides the work on hand for Italian ports, including Venice, Naples and Cagliari.

The Port of New Orleans

A sharp up-turn in the business of the Port of New Orleans during the month of August is disclosed by figures compiled by the Dock Board.

During the month 189 sea-going vessels entered the port. This was 9 more than arrived during the previous month. There were 196 departures.

The sea-going vessels arriving during August had a total gross tonnage of 803,421 tons. While this was slightly less than the tonnage of ships arriving during August, 1931, it was an increase of 28,784 tons over July of this year.

Vessels using the public wharves totalled 668,131 gross tons, an increase of 11,317 tons over the month of July.

Cargo paying tollage amounted to 247,107 tons. This was an increase of 52,883 tons over July, 1932.

During August 978,232 bunches of bananas were handled by the Board's modern conveyors, an increase of 7,970 bunches.

Inland watercraft of over 25 tons, numbering 343 vessels and having a total tonnage of 145,807 tons, arrived during the month. This was an increase of 35 vessels and 22,372 tons over the same month of the previous year, and was an equally great increase over July, 1932.

An increase was also recorded in tonnage passing through the Inner Harbour-Navigation Canal, which connects the Mississippi River and Lake Pontchartrain. During the month 1,121 vessels, having a total tonnage of 449,621 tons, used this facility. This was an increase of 33,228 tons over August, 1931.

Marked increases were recorded by many of the widely diversified commodities which move over the port's wharves. Among the imports non-metallic minerals increased 32,678 tons, textiles increased 4,182 tons, and animals and animal products increased 880 tons.

Among the exports, vegetable food products increased 15,095 tons, textiles increased 13,685 tons, and other vegetable products increased 1,060 tons.

As usual, the great majority of sea-going vessels arriving flew the American flag. Of the 189 sea-going vessels arriving, 111, having a total tonnage of 501,477 tons, were under American registry. Honduras was second in number of ships and tonnage, while Norway was third in ships and Great Britain third in tonnage.

Following is a tabulation showing nationality, number of ships and total tonnage of ocean-going vessels which arrived during the month:—

Nationality	No of Vessels	Gross Tonnage
American	111	501,477
British	10	57,167
Brazilian	1	3,569
Danish	1	2,478
Dutch	3	15,677
French	2	11,999
German	6	17,327
Honduran	25	65,017
Italian	6	35,269
Japanese	5	33,862
Norwegian	18	45,362
Swedish	1	4,217
	189	803,421

Near Eastern Port Matters

ACCORDING to statistics just published by the Statistique Générale de la Grèce, shipping at Greek ports during the first eight months of 1932 included the arrival of 1,937 ships, representing 3,314,410 n.r.t., against 2,124 ships representing 3,575,445 n.r.t. arrived during the period from January to August, 1931, and the clearance of 1,421 ships representing 2,628,995 n.r.t. against 1,495 ships representing 2,778,923 n.r.t. cleared during the corresponding period of 1931. In order to judge the position of the various foreign flags in Greek shipping it may be interesting to consider the following figures regarding shipping during the period under review:—

ARRIVALS					
	1932		1931		
	No.	N.R.T.	No.	N.R.T.	
Greek	535	541,591	662	596,934	
American	21	70,286	19	63,892	
British	145	280,906	164	364,703	
Dutch	38	68,176	33	63,395	
French	81	268,786	95	274,623	
German	50	90,063	74	150,815	
Italian	640	1,401,849	621	1,405,327	
Roumanian	92	112,113	59	68,462	

CLEARANCES					
	1932		1931		
	No.	N.R.T.	No.	N.R.T.	
Greek	222	213,667	295	290,874	
American	18	67,091	16	51,684	
British	95	126,975	103	166,958	
Dutch	23	31,864	30	27,195	
French	74	266,947	81	270,081	
German	49	99,532	60	117,052	
Italian	582	1,247,919	569	1,308,121	
Roumanian	82	102,985	55	69,431	

As far as arrivals are concerned only the American, Dutch and Roumanian flags have improved their position during the period under review, while as far as clearances are concerned improvement has been confined to the American and Roumanian flags. Even the Italian flag, which occupies first place among foreign countries trading in Greek waters, has lost ground, and it is generally concluded that the situation will not improve until the Greek Government lifts the import restrictions which have been created since January, 1932. It may be interesting, however, to examine the situation at the main Greek ports. At the Port of Piræus shipping during the period from January to August, 1932, included the arrival of 1,137 ships representing 2,239,968 n.r.t., against 1,148 ships and 2,212,072 n.r.t. arrived during the corresponding period of 1932, and the clearance of 785 ships and 1,570,981 n.r.t., against 707 ships and 1,526,208 n.r.t.

Recently, as a matter of fact, the situation has improved, largely on account of the larger imports of cereals, and to the fact that some of the tonnage laid up at Piræus has again been put on the market. The position of the various flags in the Port of Piræus is as follows:—

ARRIVALS					
PIRÆUS		1932		1931	
	No.	N.R.T.	No.	N.R.T.	
Greek	297	358,420	371	416,829	
American	21	70,285	19	63,892	
British	90	192,317	104	213,718	
Dutch	24	53,180	15	37,396	
French	74	263,169	85	271,073	
German	27	37,831	43	65,819	
Italian	352	801,487	261	648,439	
Roumanian	83	106,227	54	61,960	

CLEARANCES					
PIRÆUS		1932		1931	
	No.	N.R.T.	No.	N.R.T.	
Greek	142	147,004	138	160,601	
American	4	13,954	1	3,119	
British	34	48,525	35	69,442	
Dutch	3	4,725	3	2,728	
French	73	264,760	78	258,035	
German	10	13,788	9	13,057	
Italian	330	653,347	246	612,812	
Roumanian	74	96,163	50	50,577	

The American, Dutch, Italian and Roumanian flags have shown an increase in arrivals and clearances and the French flag in clearances only. The position of the British flag, which until recently occupied second place among foreign flags trading in the Port of Piræus, coming immediately after the Italian flag, has during the period from January to August, 1932, dropped to third place, coming immediately after the Italian and the French flags. It should be noted, however, that the decline of the British flag at Piræus is due particularly to the suspension of the mail services of the Khedivial Line, and of the Eastern Mediterranean Lines, while arrivals of British vessels from the United States of America, from Italy and from Turkey, have considerably increased.

Shipping at Patras during the period from January to August, 1932, included the arrival of 137 ships representing 288,366 n.r.t., against 195 and 455,604 n.r.t. during the corresponding period of 1931, and the clearance of 78 ships representing 277,856 n.r.t., against 76 ships and 377,071 n.r.t. Shipping

at Patras has shown during 1932 a considerable decline, due mainly to the precarious situation of the exports of Greek agricultural products and to the unsatisfactory condition of the port. The main drop has been in trade with Italy and with the United States of America. The share of the various foreign flags in the trade of the Port of Patras is shown in the following schedule:—

ARRIVALS					
PATRAS		1932		1931	
	No.	N.R.T.	No.	N.R.T.	
Greek	13	6,767	17	46,412	
American	—	—	—	—	
British	15	24,675	14	21,027	
Dutch	5	4,156	8	11,265	
French	—	—	—	—	
German	8	9,374	7	8,153	
Italian	52	217,638	83	312,749	
Roumanian	—	—	—	—	

CLEARANCES					
PATRAS		1932		1931	
	No.	N.R.T.	No.	N.R.T.	
Greek	1	182	9	40,806	
American	4	13,872	1	3,074	
British	20	25,834	12	15,342	
Dutch	8	10,978	1	646	
French	—	—	—	—	
German	8	10,275	6	6,408	
Italian	34	213,329	44	268,084	
Roumanian	—	—	—	—	

Only the British and German flags have improved their position at Patras in regard to arrivals, while the outward shipping included a larger share under the American, British, Dutch and German flags. The improvement under the British flag refers practically exclusively to trade with the United Kingdom, while it may be interesting to note that the progress of the Dutch flag and of the German flag refers particularly to trade with Germany, in which there has been keen competition.

Finally there is the Port of Salonika, where shipping during the first eight months of 1932 included the arrival of 105 ships representing 150,023 n.r.t., against 124 ships and 184,308 n.r.t. during the corresponding period of 1931, and the clearance of 102 ships representing 176,130 n.r.t. against 130 ships and 220,397 n.r.t. Traffic at Salonika has shown a decline, due, according to statements issued by officials of the Harbour Board at that port, exclusively to the restrictions on imports which have been imposed by the Greek Government. The position of the various flags is summarised as follows:—

ARRIVALS					
SALONIKA		1932		1931	
	No.	N.R.T.	No.	N.R.T.	
Greek	36	47,064	23	23,588	
American	—	—	—	—	
British	13	21,943	14	33,527	
Dutch	4	4,124	5	8,000	
French	1	185	3	1,182	
German	4	7,917	4	6,008	
Italian	17	37,733	34	60,156	
Roumanian	8	4,434	5	3,502	

CLEARANCES					
SALONIKA		1932		1931	
	No.	N.R.T.	No.	N.R.T.	
Greek	10	21,012	17	19,358	
American	4	13,398	8	25,568	
British	17	25,651	18	30,507	
Dutch	—	—	2	2,518	
French	—	—	—	—	
German	2	4,023	7	11,436	
Italian	22	40,566	36	71,434	
Roumanian	2	2,118	—	—	

With the exception of the German and Roumanian flags, all countries have shown decreases in arrivals at Salonika. In this connection it ought to be noted that many foreign lines have ceased calling at that port, and this is the main reason for this drop.

The Yugoslav Government has just issued detailed statistics regarding the situation of trade at the Yugoslav free zone in the Port of Salonika. According to these statistics, during 1931, 106 vessels representing 154,677 n.r.t. have called at the free zone, against 81 vessels and 117,121 n.r.t. during 1930. The total imports into the Yugoslav zone during 1931 included 1,435,458 cents against 896,908 cents during 1930, and total exports 1,376,893 cents against 803,754 cents.

A New Chart.

Messrs. George Philip and Son, Ltd., have recently issued a most interesting chart which is known as "Lloyd's Chart of Shipping Routes and Ports" and which has been compiled from actual voyages recorded at Lloyd's.

The chart is 48-in. by 30-in. and shows all the more important trade routes of the present day, and also includes all ports which are in present-day use. The chart also shows the speeds and times against each route from one place to another.

The chart is priced at 12s. 6d. and will prove most useful to all connected with the sea.

Notes from Far Eastern Ports



Port of Karachi, India.
General View showing Oil Pier and Installations in foreground, the East Wharf with 17 Ship Berths, the Reclamation for the New West Wharf of which Two Berths have been completed with Transit Sheds. Salt Works in the distance. January, 1932.

Ceylon

Colombo's Foreign Trade.

STATISTICS of Ceylon's foreign trade during September, as contained in the latest Customs Returns, point to a very poor period of commercial activity, both compared with the corresponding month during 1930 and 1931, as well as with the previous months this year. The total value of the island's exports during September was Rs.14,701,728, which, excluding July's figures, is the lowest for the year. In July, it will be remembered, the exports fell to figures obtaining 24 years ago, the value being Rs.13,287,027.

The following table shows the trend of Ceylon's export trade during 1930-32:—

	Rs.
September, 1930	23,150,228
September, 1931	16,844,404
September, 1932	14,701,728

Rubber exports, however, show a record total for the year, and the upward trend that was defined in July has been maintained. The figures for the year are:—

	lbs.
January	10,990,043
February	10,107,934
March	7,859,749
April	6,970,645
May	8,668,177
June	7,640,426
July	7,829,478
August	10,615,646
September	11,732,908

Imports have gone down steadily during the year, and September figures are the lowest for the past nine months. In January the figure was Rs.20,043,544. In July it had fallen to Rs.18,536,992, and last month the figures reached Rs.14,774,321. Last year, too, September was a poor month for imports, the total value being Rs.16,129,751. September, 1930, figures were Rs.21,644,508.

It is interesting to note that Japan's bleached cotton piece goods trade is at a lower level than in the previous month. There were 2,196,885 yards imported in September, compared with 2,471,152 in August. The total for the year is 10,570,245 yards.

The United Kingdom figures, too, have fallen from 777,168 yards in August to 665,739 in September.

A general increase of Rs.1,166,982.39 was registered in Customs duty collected for the first nine months of the year, compared with the corresponding period last year, chiefly caused by the general rise in duties. The figures for January-September, 1932, are Rs.32,611,917.60, and those for last year's corresponding period were Rs.31,444,935.30.

The total import duties for September were Rs.2,202,823. The previous month's figures were Rs.4,387,493. Export duties for September amounted to Rs.389,256, compared with Rs.451,361 in August.

Colombo Harbour Dues.

Harbour dues, too, show a decrease, reflecting a slackening in the amount of shipping using the Port of Colombo. In September the dues were Rs.217,778, compared with Rs.250,042 the previous month and Rs.242,154 in September, 1931. The decrease for the first nine months this year compared with last year's corresponding period was Rs.77,774.

Karachi

Karachi Port News.

The statistics of the foreign trade of the Port of Karachi for August, 1932, just issued, show that the total value of imports (merchandise) amounted to Rs.17,900,000, or an increase of Rs.45 lakhs, and exports Rs.69 lakhs, or a decrease of Rs.22 lakhs, compared with the figures for August, 1931. The progressive totals for the five months ending August, 1932, show an increase of Rs.17 lakhs or 2 per cent. under imports, but a decrease of Rs.13,100,000 or 25 per cent. under exports.

The increase under cotton manufactures occurred in receipts in all three main sub-divisions of piece goods, namely, grey, white and coloured. The imports of grey goods amounted to 3½ million yards, valued at Rs.6 lakhs, against ¾ million yards valued at a lakh, while those of white and coloured goods totalled 19½ million yards, valued at Rs.32 lakhs, and 13 million yards valued at Rs.27 lakhs against 14½ million yards valued at Rs.23 lakhs, and 6 million yards valued at Rs.13 lakhs respectively in 1931.

The total imports of cotton piece goods during the five months ending August, 1932, amounted to 140 million yards, valued at Rs.24,900,000, showing an increase of 41 per cent. in value as compared with the corresponding period of 1931.

Near Eastern Port Matters—continued

More Piecegoods Imports.

The imports of cotton piece goods from the United Kingdom through the Port of Karachi during the first five months amounted to over 32 million yards, valued at Rs.18,400,000 lakhs, an increase of 19 per cent. in quantity and 17 per cent. in value, while those from Japan amounted to 35½ million yards valued at Rs.56 lakhs, an increase of 252 per cent. in quantity and 217 per cent. in value as compared with the corresponding period for 1931-32.

The total quantity of cotton exported during the five months ending August, 1932, was 34,007 tons, against 57,385 tons during the corresponding period of last year.

The total quantity of wheat exported during the first five months of 1932 amounted to 227 tons, against 16,234 tons during the corresponding period of 1931-32.

Burma

Rangoon Port Matters.

The total value of all minerals exported during the year 1931, according to statistics just available, through the Port of Rangoon was Rs.126,494,512. Minerals to a total value of Rs.92,461,010 were exported to India, and to a total value of Rs.34,033,502 to foreign countries. Minerals worth Rs.12,356,766, as against Rs.16,295,560 in the previous year, were imported into Burma during 1931. Of the minerals imported Rs.8,520,445 worth were imported from India and the balance from abroad.

With regard to lac exports through the Port of Rangoon there was really a marked improvement, the total advancing from 3,111 cwts., valued at Rs.2.62 lakhs, to 6,689 cwts., valued at Rs.1.15 lakhs. Out of this Germany took 1,898 cwts., valued at Rs.0.36 lakhs, and Belgium 4,791 cwts., valued at Rs.0.79 lakhs, as against nil in the previous year. U.S.A., who was the principal customer last year, dropped away from the list.

Port of Rangoon Loan.

Tenders are invited by the Commissioners for the Port of Rangoon for Rs.1,200,000 of the 5½ per cent. debenture loan of Rs.5,400,000, 1942-47, in whole or part. The balance of Rs.4,200,000 will be reserved and set apart for the investment of the Commissioners' various funds. The whole of the issue of Rs.1,200,000 had been under-written at par.

Bombay

Bombay Port Trust: Financial Position.

The Trustees of the Port of Bombay, at their meeting held on September 8th, considered a report by the Chairman on the financial position and, in view of the severe and prolonged falling off in receipts from trade and the consequent heavy increase in their budgetted deficit, they decided to levy, with effect from October 1st, 1932, and subject to the sanction of Government an additional surtax of 12½ per cent. on the present inclusive charges at the docks and bunders. Those charges hitherto exempted from surtax will continue to be exempt, with the exception of import wharfage on kerosene and fuel oil. Wharfage on petrol, water and dry dock charges, passengers' baggage and certain other sundry charges will remain exempt from surtax.

The following revisions of towage charges were also sanctioned: (a) A charge of Rs.30 per tug for the services of dock tugs assisting vessels inside the docks and Rs.45 when operating outside; (b) the existing towage fees for the services of the steam tugs "Rose" and "Doris," i.e., Rs. 45 for attending and Rs.115 for assisting vessels to be substituted by a fixed charge of Rs.100 for attendance or assistance.

The Chairman's report showed that the trade receipts for 1931-32 were approximately Rs.27 lakhs, or over 11 per cent., less than those for the previous year, and Rs.68 lakhs, or nearly 25 per cent., less than in 1929-30. The receipts for the first five months of the current financial year were less by Rs.13 lakhs than for the corresponding period of the previous year. Although there is at present some indication of a slight recovery in trade, the heavy falling off since the beginning of the year will inevitably cause the final deficit to be much greater than the budget forecast of last January.

The report also drew attention to the fact that during the past decade the Port of Bombay has avoided any increase in charges and has in fact sanctioned during that period reductions and remissions which have benefited trade to the extent of over a crore of rupees. This was rendered feasible by drastic retrenchments in all departments—which have reduced controllable expenditure by some Rs.31 lakhs a year, or approximately 30 per cent.—and by restricting capital expenditure to bare essentials, thereby enabling the Trust to avoid any capital borrowing for the past seven years. As a result of the economic crisis the Trust's reserves have had to meet deficits to the extent of over Rs.44 lakhs during the past two years. The present increase

of charges has been forced on the Trust as an emergency measure to enable it to finance the heavy deficit of the current year without unduly impairing the stability of its reserves.

As a further measure of retrenchment the Board decided to advertise for disposal as surplus to present requirements the steam tug "Elf," a tug attached to the dredging flotilla, and the pilot schooner "Dolphin." The latter vessel, built in the R.I.M. Dockyard in 1911, has for some years past been used as a relief to the steam pilot vessel "Lady Wilson" during the withdrawal of the latter for dry docking and annual survey; this relief work will in future be carried out by the steam tug "Rose." It is estimated that the sale of these two vessels will effect an annual saving of about Rs. 30,000 in wages, stores and repairs.

Completion of the Deepening of Alexandra Dock Channel.

At a meeting of the Trustees of the Port of Bombay held on September 20th, 1932, the following were the main items of business disposed of:—

Mr. R. B. McGregor, A.M.I.M.E., Senior Assistant Mechanical Superintendent, was confirmed as Mechanical Superintendent vice Mr. R. McMurray, retired.

A supplementary capital estimate amounting to Rs.97,905 was sanctioned, subject to the necessary sanction of Government, for completion of the work of deepening the Alexandra Dock Channel, including cleaning and proving, in the current financial year. The unexpended balance out of the sanctioned estimate for this work is Rs.1,68,922, and the expenditure will be met from loan balances in hand.

In pursuance of their policy of retrenching all posts surplus to present requirements the Board decided to abolish four posts of sub-engineer, one post of junior assistant loco foreman and four junior posts in the engineering department, the incumbents being allowed the full benefits admissible to retrenched employees. The resultant saving in staff expenditure will be about Rs.28,000 per annum.

Draft Administration Report Approved.

At a meeting of the Trustees of the Port of Bombay held on October 4th, 1932, the following were the main items of business disposed of:—

The draft Administration Report for the year 1931-32 was considered and approved.

Subject to the sanction of Government, Docks By-law No. 109 was amended to permit of hemp in full pressed bales being accepted for storage in the docks transit sheds pending shipment.

In view of the accelerated arrival of the English mail steamers, which now generally arrive at Ballard Pier on Thursday afternoon, sanction was accorded to the provision of additional lighting outside the Baggage Hall to facilitate the clearance of passengers' baggage.

Port of London Notes

London's Shipping.

During the week ended September 30th 939 vessels, representing 944,028 net register tons, used the Port of London; 423 vessels (726,098 net register tons) were to and from Colonial and foreign ports and 516 vessels (217,930 net register tons) were engaged in coastwise traffic.

* * * *

During the week ended October 7th 842 vessels, representing 941,353 net registered tons, used the Port of London; 442 vessels (750,139 net registered tons) were to and from Colonial and foreign ports, and 400 vessels (191,214 net registered tons) were engaged in coastwise traffic.

* * * *

During the week ended October 14th 995 vessels, representing 895,620 net registered tons, used the Port of London; 443 vessels (701,942 net registered tons) were to and from Colonial and foreign ports, and 552 vessels (193,678 net registered tons) were engaged in coastwise traffic.

* * * *

During the week ended October 21st 907 vessels, representing 927,241 net registered tons, used the Port of London; 442 vessels (750,768 net registered tons) were to and from Colonial and foreign ports and 465 vessels (176,473 net registered tons) were engaged in coastwise traffic.

Tilbury Passenger Landing Stage.

Thirty vessels totalling 286,246 gross registered tons used the Tilbury passenger landing stage during the month of September. Altogether 6,804 passengers were embarked or disembarked at the stage, in addition to baggage and mails.

North-East Coast Notes.

Substantial Coal Contracts for the Tyne and Wear.

THE recent very substantial coal contracts which have been placed in the Tyne and Wear area from Scandinavia are expected materially to improve the local coal shipments and absorb some of the idle tonnage, although at the time of writing, the orders—which total nearly 300,000 tons—have not affected business. The demand generally for best steam fuel has been so persistent of late that prices are very firm and a little more trade would lift some grades above the minimum. There is still a tendency for idle shipping to decrease, although the official October figures are not available at the time of writing.

Steamers Laid-up on the Tyne.

Mr. H. P. Everett, Chairman of the Tyne Improvement Commission at the September meeting, said that on August 11th there were 180 steamers, representing a tonnage of 391,000 tons, laid up. At the time of the meeting there were 165 vessels representing 354,000 tons. They had heard that more vessels were likely to leave, and if the homeward markets continued their present course many more would move.

Tyne Trade Outlook.

"As regards our own coal exports," Mr. Everett continued, "we are down on the year by 1,200,000 tons as compared with last year. This, however, was not unexpected, and if continued at the same rate we should be 2,000,000 tons down on last year—our anticipated figure. But the continuous decrease has apparently stopped and, in some instances, an upward movement is apparent. Our principal decreases are to Germany, Belgium and France, the last-named country being responsible for a shortage of over half-a-million tons this year. From news reaching us from various sources, however, I think that, ere long, a change will take place in our quantities to Germany and France."

In Scandinavian countries—Norway, Sweden, Denmark, Finland, and so forth, Mr. Everett added, there was a decided movement to buy British. This was especially to be noted in Denmark, and he had been given to understand that that was not local but national. It was interesting to note that home trade figures were moving upwards. London, in eight months, had increased by 97,000 tons and other coastwise ports in the United Kingdom by 38,000 tons. Trade to the West Indies had increased remarkably, the figures being up by nearly 170,000 tons, but unfortunately, that had been counterbalanced by shortages in Spain, Italy and Egypt.

Since making that speech, Mr. Everett, in company with Mr. Richard Aughton and other members of the Tyne Improvement Commission, has visited Copenhagen and on his return expressed great satisfaction at the fine showing that Tyneside made, and expressed the belief that there was every prospect of substantial advantages accruing to the North-East coast.

Exports of Tar and Creosote.

At the September meeting of the Tyne Commission the Harbour and Ferry Committee called attention to the fact that the Consett Iron Co., Ltd., had made application for permission to erect two storage tanks for tar and creosote. Sir George Lunn, referring to this new export trade of the Consett Iron Co., said it should never be forgotten that the Tyne was something more than a coal exporting river. There was a large general trade and it was being developed. In a report on this proposal the Commissioner's Engineer explained that the storage tanks are proposed to be situated on the Quay landward of the east staith, the east tank for tar being about 37-ft., and the west tank for creosote being about 46-ft. landward of the face of the quay wall southward of the staith. The diameters and capacities of the tanks are as follow:—The east tank for tar is 81-ft. in diameter with a capacity of 4,000 tons. The west tank for creosote is 75-ft. in diameter, with a capacity of 3,000 tons. A retaining moat wall is to be constructed enclosing the tanks and to form a safety reservoir, the capacity of which is to be 105 per cent. of the total capacity of the tanks. The tar and creosote are to be conveyed to the staiths in rail tank wagons and the contents run from them through two pipes 12-in. and 8-in. in diameter, respectively, laid on supports along the south side of the staith, over the upper bridge and into the storage tanks. A delivery pipe 8-in. in diameter is to extend from the storage tanks over the lower bridge and to about 7½-ft. landward of the face of the staith, at a point about 265-ft. westward of the east end. A flexible connection about 8-in. in diameter is to be used between the end of the fixed pipe and the ship.

Mr. R. S. Dalgliesh, touching upon the Hudson Bay trade which he was trying to develop, said, in the shop windows of Winnipeg there were exhibited goods from Newcastle,

together with copies of the bills of lading of the steamer Pennyworth, which carried the merchandise. That was what Canada was doing to help them.

A Precautionary Move.

With the object of minimising the risk incidental to the trade in petroleum spirit, an agreement has been arrived at between the Tyne Commissioners and the Corporations of Newcastle, Gateshead, South Shields, Tynemouth, Wallsend, and the Urban District Council of Newburn, regarding precautionary measures which may be considered advisable in the event of an emergency arising as the result of petroleum spirit finding its way into the Tyne. A committee representative of the signatories to the agreement is to be set up to consider questions in connection with the scheme, one of which is the co-ordination of fire-fighting forces.

Good progress is being made with Newcastle Corporation's quay extension east of Ouseburn. The superstructure is at present in the course of construction for a length of about 200 lineal feet, and the decking is completed for a length of about 88 lineal feet or 13 per cent. of the total length of the quay. It was stated that 699 vessels had used the quay during the six months ended September 30th, 1932, these being of a net registered tonnage of 451,948 tons.

North-East Trade Statistics.

The Tyne coal and coke shipments in July and August amounted to 1,897,148 tons compared with 2,082,910 tons in the corresponding months of last year, a decrease of 185,762 tons. From January 1st to August 31st the shipments were 8,283,621 tons compared with 9,339,596 tons in the first eight months of last year, a decrease of 1,055,975 tons, or 11.31 per cent. Bunker coals taken in the port in the past eight months was 1,167,617 tons, compared with 1,201,000 tons last year, a decrease of 33,382 tons. At the Commissioners' staiths and docks the total was this year 581,180 tons, comparing with 568,929 tons last year, an increase of 12,251 tons.

The returns for the Wear to the end of August show an increase of 25,670 tons in the coal and coke shipments, the total being 3,075,405 tons in 1932 against 3,049,735 in 1931. The exports other than coal totalled 39,251 tons in 1932, against 43,073 in 1931, while the imports had dropped from 200,454 tons in 1931 to 189,829 tons in 1932.

It was stated at the September meeting of the Blyth Harbour Commission that the shipments of coal from the port for the eight months ended August 31st were 3,082,018 tons, compared with 3,152,175 tons in 1931, and 2,843,293 tons in 1931. This shows a 2 per cent. decrease as compared with 1931, but an increase of 8 per cent. over the corresponding period in 1931.

Hartlepool's shipment of coal has been steadily on the increase for the past two years. For the first nine months of this year coal shipments from the port totalled 2,355,782 tons, compared with 2,330,320 tons for the same period of 1931. Timber imports for the first nine months of the year showed an increase of 8 per cent. compared with the same period of 1931. The imports totalled 251,317 loads as against 232,267 loads for 1931.

Port of Preston.

The total imports and exports passing through Preston docks during the five months ending August was 363,153 tons, of which 278,793 tons were imports. These figures showed a considerable increase over the corresponding period last year. The total revenue for the five months was £79,187, showing a slight decrease on the five months in 1931. The total number of vessels last month was 155 against 135 in August last year.

Good Work at Avonmouth.

An explanation why Avonmouth is often grouped with the Continental ports in the matter of low freight rates is available in the case of the s.s. "Ercole" from the River Plate. This steamer, with 7,500 tons maize, commenced work on Tuesday, October 4th, and without any overtime being incurred discharge was completed on Friday afternoon, October 7th, nearly 8,000 tons being handled in 30 working hours.

Manchester Ship Canal Company.

According to the monthly traffic return of the Manchester Ship Canal Co., there was a substantial decline in the traffic receipts during the month of September, the total being £71,027, as against £83,715 in the same month last year. That is a fall of about 12½ per cent. The total receipts for the first nine months of 1932 amounted to £842,433, compared with £861,003 for the corresponding period of 1931.

Aden Port Trust.

The following are the returns for the month of August, 1932, of shipping using the port:—

	No.	Tonnage
Merchant Vessels over 200 tons ...	110	461,824
" under 200 tons ...	1	162
Government Vessels ...	1	3,942
Dhows ...	39	677
PERIM.		
Merchant Vessels over 200 tons ...	16	55,450

The total value of imports, excluding Government stores, was Rs.40,22,000, as compared with Rs.41,46,000 for August, 1931, and of exports Rs.26,47,000, as compared with Rs.20,20,000.

The total value of both imports and exports together was Rs.66,69,000, as compared with Rs.61,66,000.

Imports during the month were above those for August, 1931, in the case of coffee, grain, pulse and flour, hardware, seeds, piece goods (grey, white and printed or dyed), tobacco (manufactured), and treasure (private); and below in the case of

TRADE OF THE PORT.

Article.	Unit	Imports.		Exports.	
		Quantity.	Value Rs.	Quantity.	Value Rs.
Coal ...	Tons	0	0	0	0
Coffee ...	Cwts.	7,196	2,32,059	7,066	3,25,653
Grain, Pulse and Flour ...	"	30,905	1,72,514	13,919	75,958
Gums and Resins ...	"	151	4,142	1,520	24,304
Hardware ...	"	0	16,870	0	23,675
Hides, raw ...	No.	1,240	846	3,508	3,283
Oil, Fuel ...	Tons	31,354	7,83,850	0	0
" Kerosene ...	Gls.	21,303	16,109	3,608	2,528
" Petrol ...	"	75,856	82,993	640	777
Salt ...	Tons	0	0	28,280	3,14,360
Seeds ...	Cwts.	4,411	36,414	478	5,145
Skins, raw ...	No.	106,163	39,237	105,558	51,326
Sugar ...	Cwts.	4,845	30,612	10,254	66,166
Textiles—					
Piece Goods, Grey ...	Yds.	4,382,119	6,12,158	3,471,140	4,63,173
" " White ...	"	713,251	1,28,528	196,543	35,128
" " Printed or Dyed ...	"	1,050,925	2,20,419	1,202,080	2,79,851
Twist and Yarn ...	Lbs.	176,040	86,025	143,691	66,723
Tobacco, Unmanufactured ...	"	577,304	96,860	658,084	1,03,099
" Manufactured ...	"	52,248	46,057	22,344	20,272
Other Articles ...	No. of Pkges.	32,055	7,20,756	15,026	3,42,747
Treasure, Private ...	—	0	6,95,033	0	4,43,232
Total ...	—	—	40,21,482	—	26,47,405

The number of merchant vessels over 200 tons that used the port in August, 1932, was 110, as compared with 108 in the corresponding month last year, and the total tonnage was 462,000, as compared with 444,000.

Excluding coal, salt, fuel oil and military and naval stores and transhipment cargo, the total tonnage of imports in the month was 5,700 and of exports 3,600, as compared with 7,200 and 3,200 respectively for the corresponding month last year.

gums and resins, hides (raw), skins (raw), sugar, twist and yarn, and tobacco (unmanufactured).

Exports were above those for August, 1931, in the case of coffee, grain, pulse and flour, gums and resins, hardware, piece goods (grey, and printed or dyed), twist and yarn, tobacco (unmanufactured and manufactured), and treasure (private); and below in the case of hides (raw), seeds, skins (raw), sugar and piece goods (white).

Irish Harbour Matters

Dublin

Dublin Tonnage Rates.

IN the course of a letter sent by the Dublin Port and Docks Board in reply to a request from the Transport and Marine branch of the Department of Industry and Commerce, in regard to tonnage dues, it was stated that at present vessels arriving from a foreign or colonial port are charged dues at 9½d. per ton, and vessels arriving coastwise or from a British port are charged 5½d. per ton.

In the case, however, of a vessel arriving from a foreign or colonial port and discharging only such an amount of cargo as is less than 50 per cent. of the register tonnage of such vessel, only half tonnage dues are charged. It might be explained that the difference in the rates levied, which as provided for in the Board's Acts, was attributable to the fact that Dublin, in common with all considerable ports, had had to expend considerable sums of money in providing accommodation for foreign vessels, which are, of course, of greater tonnage than the coastwise, and require deeper berthage and more extensive facilities for discharging.

Actually the Board had, within the last twelve years, expended close on £160,000 to provide additional deep water accommodation. So far as the Board were aware, the practice of differentiating between the two classes of vessels was universal at all large ports and was explainable for the same reason as that already given.

The letter added that, in the event of it being decided that any alteration should be made in the existing class, the procedure for that purpose was laid down in the Acts relating to the Board, and involved the summoning of a number of

meetings of the Board. No variations could, therefore, take effect until after the expiration of a minimum period of sixty-six days from the date at which the Board decided that a variation should be made.

Belfast

Belfast Harbour Affairs.

At a meeting of the Belfast Harbour Commissioners on the 4th October, Mr. R. E. Herdman presiding, the report of the Harbour Master was submitted. It showed that 269 vessels entered the port in the period from September 17th to October 1st, as follows:—Coastwise and cross-channel, 247; foreign, 17; non-trading, 5.

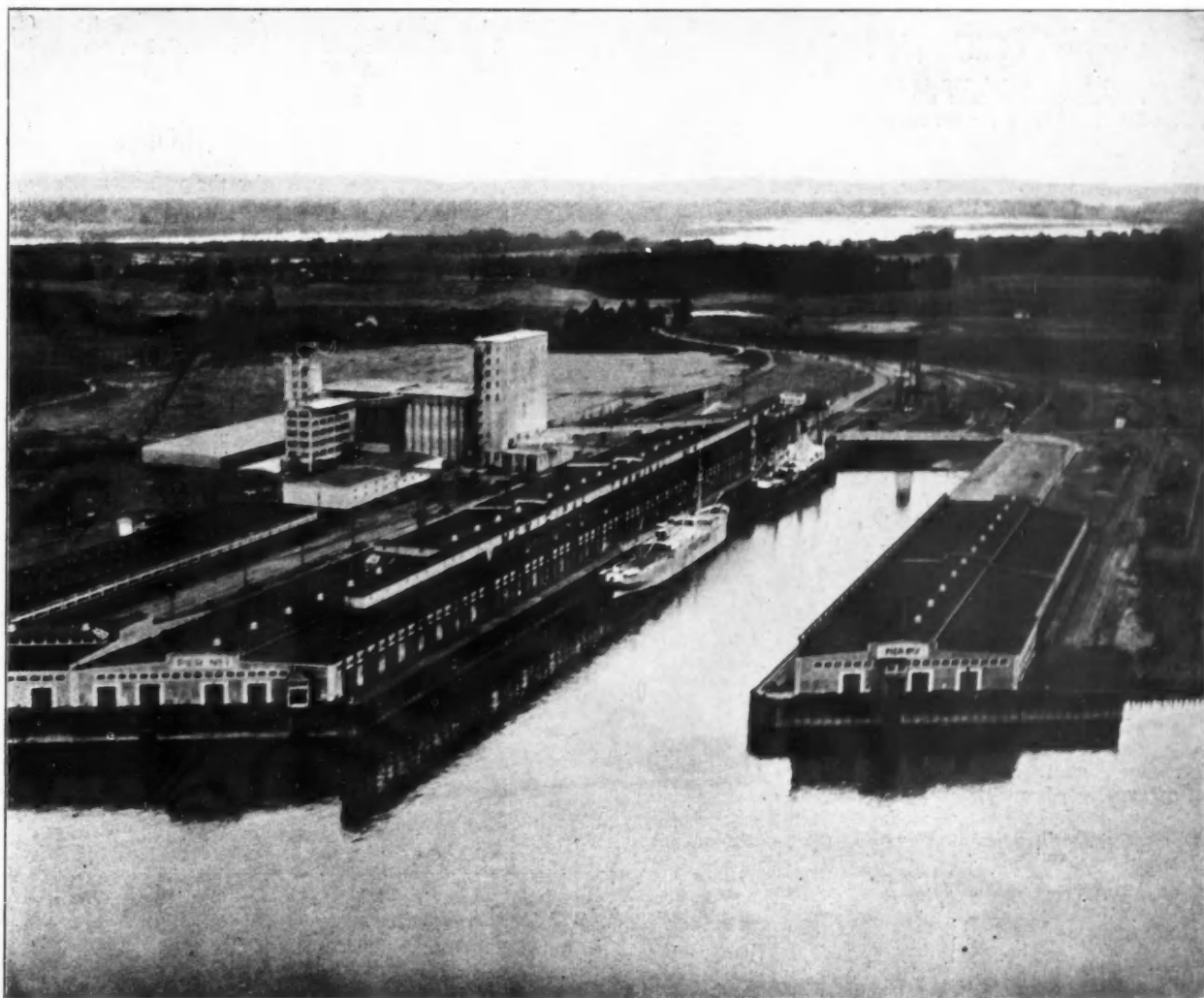
The total tonnage of the vessels using the port from January 1st to October 1st was as follows:—Coastwise and cross-channel, 2,137,477, a decrease of 5,592 compared with the corresponding period of 1931; foreign, 592,877, an increase of 24,680; non-trading, 53,225, a decrease of 13,776. Grand total, 2,783,579, an increase of 5,312.

A report from the Harbour Engineer intimated that the caisson of the Thompson Graving Dock is in need of overhaul and suggesting that as the work will necessitate the placing of the dock out of commission temporarily, the present might be an opportune time for placing the work in hand.

It was decided that the necessary overhaul be carried out and that the Harbour Engineer be authorised to obtain for the consideration of the Board alternative tenders for carrying out the portion of the work to be placed out in contract: (a) in the caisson chamber at the entrance to the Thompson Dock, and (b) in the Alexandra Dock.

The Port of Portland, Oregon

A Major Port of the United States



[Photo]

Air View of portion of Terminal No. 4, Portland, Oregon.

[Brubaker Aerial Surveys,
Portland, Oregon]

General

PORTLAND, Oregon, the principal port of the Pacific Northwest and one of the major ports of the United States, is located on the Willamette River a few miles above its confluence with the Columbia and at a distance of some 96 nautical miles from the sea. Since the establishment of Fort Vancouver on the Columbia River in the early years of the last century, shipping has played an important role. As early as 1836, the same year that the steamer "Savannah" completed the first trip across the Atlantic Ocean, the s.s. "Beaver," built on and conveyed from the Thames, was operating out of the Columbia River. By 1846 so important had become shipping to the Columbia River that the Oregon territorial legislature recognized this fact by setting up the first pilot board. In 1868 the bark "Helen Angier" transported the first direct shipment of wheat from the Columbia River to Liverpool and this voyage became the forerunner of a great cargo movement of grain between the Pacific Northwest and the United Kingdom. Shoaling in the Columbia River and at the mouth made navigation difficult, and in 1878 the United States Government undertook its first project for the improvement of the channel and to-day the bar that once existed at the mouth of the river has been entirely eliminated, leaving a depth of 40 to 60-ft. of water. The Government project now nearing completion will leave a channel 35-ft. deep and 500-ft. in width from Portland to the sea, thus permitting the accommodation of all but the very largest vessels.

Furs, lumber, wheat and salmon first attracted shipping to the Columbia River and to-day, with the exception of furs, these commodities are still important items of export through the port of Portland. Portland's hinterland known as the Columbia Basin consists of some 200,000 square miles of territory rich in natural resources and accessible via the Columbia gorge to Portland's harbour by the only water grade through the Cascade Mountains. In addition to the Columbia basin

the Willamette Valley, unsurpassed for agricultural pursuits and blessed with ideal climatic conditions, finds its outlet through the port of Portland. Portland's fresh water harbour on the Willamette River consists of approximately 27 miles of deep water frontage varying in widths from 900 to 1,600-ft., and is provided with 7 miles of berthing space for deep sea carriers. For the year 1931 the total port commerce, deep sea and local, amounted to 8,593,888 tons, a greater figure than that of any of the major ports of the Pacific Northwest and only 4.41 per cent. under the 1930 figure for deep sea tonnage.

Port Organisation and Facilities

Differing from most ports, Portland has two organizations, each operating within well-defined limits, but both having partial jurisdiction over its harbour. The Port of Portland Commission organized as a port district is a body composed of members who were formerly appointed but who, beginning this autumn, will be elected. The members of the Port of Portland Commission serve without pay. The Port of Portland is charged with the maintenance of the channel and also operates two dry docks, and in recent years has laid out and operates a modern airport along the Willamette River within only a few moments drive from the heart of the city.

The Commission of Public Docks is the other port body. It is a separate department of the city of Portland and was created as such by a charter amendment in 1911. This Commission consists of five commissioners, serving without compensation, who are appointed by the Mayor. The Commission of Public Docks has jurisdiction over the entire waterfront of the City of Portland and in addition owns, maintains, and operates three public terminals known as Municipal Terminals 1, 2 and 4. Terminals 1 and 2 are general cargo terminals, but Municipal Terminal No. 4, by far the largest on the Pacific Coast, has in addition to general cargo facilities,

The Port of Portland, Oregon—continued

10,000-ton capacity coal bunkers, with car tipper and conveyors for the expeditious bunkering of vessels. At Terminal 4 is situated a 2,000,000 bushel grain elevator capable of conveying bulk grain to vessels at the rate of 30,000 bushels per hour. Bulk vegetable oil tanks of 1,486,800 gallons capacity are also located at Terminal No. 4, as is a cold storage plant for the handling of fruits and other perishables at shipside. The Commission of Public Docks, over its terminals handles approximately one-half of the general cargo business of the port and while it has been the policy of the Commission to solicit business equally available to competing ports, it has never been its practice to demand more than a reasonable share of the tonnage passing through the port, always recognizing the right of the private docks to exist without undue interference on the part of the Commission. Under the City Charter the Commission of Public Docks has power to levy taxes for the purposes of meeting its interest and bonded debt requirements, but its terminal operating expense and maintenance must be met from operating revenues.

In addition to the splendidly equipped municipal terminals, Portland is amply provided with private wharves for general cargo requirements. In addition to the general cargo wharves there are seven grain and flour docks, five export grain elevators, and seven lumber docks, all privately owned and operated.

Portland, as the logical centre of distribution for the Pacific Northwest, has in recent years attracted many of the larger oil companies who have established their own wharves and storage facilities at this port. At the present time there are nine large companies who have their own wharves and have established their storage facilities for fuel, diesel, refined, and lubricating oils as well as gasoline. From Portland these oil products find their way to the interior by rail and auto truck; the motor trucks now handle a large portion of this business and distribute it by means of specially constructed tank wagons.

In addition to the fifty odd regular steamship services calling at Portland, four transcontinental railways, innumerable truck lines and river steamers, serve the port.

Portland, in addition to being the principal commercial metropolis of the great north-west country, to which its geographical location so eminently entitles it, offers to the tourist unsurpassed attractions of mountain, lake, river, and ocean scenery, while the game of the Oregon wilds and the fish in its well-stocked streams, makes the country tributary to Portland truly a sportsman's paradise.

Developments and Maintenance

In 1911 a comprehensive plan was drafted for the reconstruction of the harbour and waterfront facilities. Since then Terminals 1 and 2, and Terminal 4 with its elevator and other special facilities have been constructed, while Terminal 3 was acquired when St. Johns became a part of this city. Terminal 3 and, most of the real estate thereof, has since been sold to the County to permit the erection of the St. Johns Bridge, which was officially opened in June, 1931. The major construction programme of the Commission ended with the completion of a cold storage plant in 1923, except for a million bushel storage annex to the elevator which was finished in September, 1930. This entire terminal development involved the sale of \$10,500,000 in bonds, authorised by the voters, and of which \$2,720,200 was redeemed prior to November 30, 1931.

As an indication of age and maintenance requirements, the attached table shows the dates of completion of most of the units constructed by the Commission.

MUNICIPAL TERMINAL No. 1

Description	Completed
Quay Dock—Unit No. 1	March, 1913
Quay Dock—Unit No. 2	February, 1915
Quay Dock—Widening entire Dock... ..	February, 1924
Warehouse No. 1	February, 1915
Pier A—60-Foot Open Dock	May, 1915
Pier A—Shed	May, 1916
Pier B—Substructure	June, 1922
Pier B—Shed	August, 1922

MUNICIPAL TERMINAL No. 2

Description	Completed
Dock No. 2—Substructure and Shed	May, 1915

MUNICIPAL TERMINAL No. 4

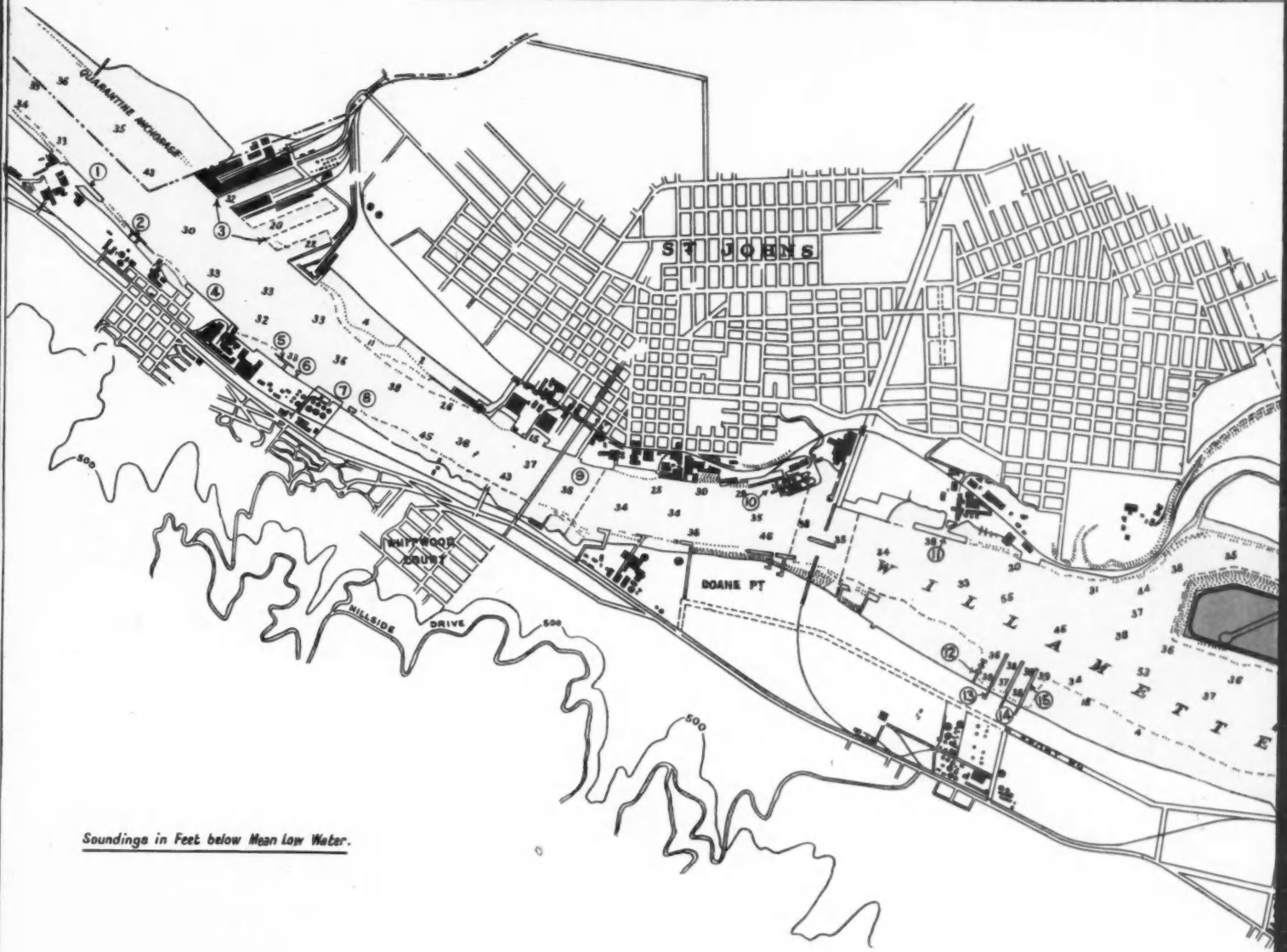
Description	Completed
Pier No. 1—House 4 and Substructure; House 2 and 3	February, 1919
Pier No. 1—Substructure House 1	July, 1920
Pier No. 1—Sheds, Houses 1, 2 and 3	April, 1920
Pier No. 1—House 5	March, 1923
Ventilated Warehouse	January, 1923
Pier No. 2—Wharf and Substructure	July, 1920
Pier No. 2—Shed	July, 1921
Pier No. 5—Quay Portion and Bulk Handling Plant	November, 1920
Pier No. 5—Slip Portion	April, 1921
Welfare Building	June, 1920
Administration Building	1919
Restaurant Building	September, 1919



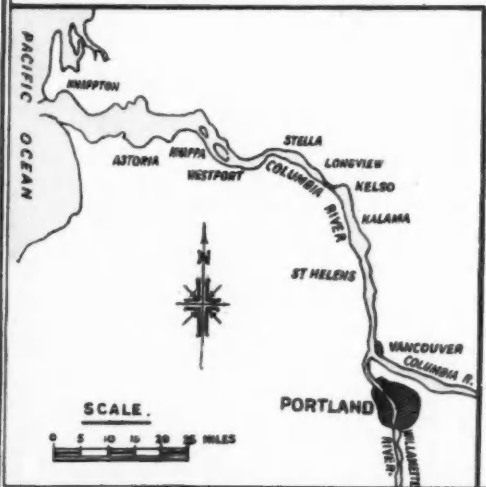
Shipment of Flour for the Orient, Pier 1, Terminal No. 4, Portland, Oregon.

PORT OF PORTLAND, OREGON

UNDER THE JURISDICTION OF THE COMMISSION OF PUBLIC DOCKS, PORTLAND



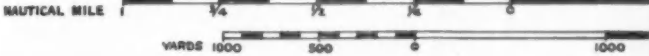
Soundings in Feet below Mean Low Water.



PRINCIPAL DOCKS.

- | | |
|--|--------------------------------------|
| 1. WEST OREGON LUMBER CO DOCK | 21. EASTERN & WESTERN LUMBER CO DOCK |
| 2. ASSOCIATED OIL CO | 22. PACIFIC COAST ELEVATOR DOCK |
| 3. MUNICIPAL TERMINAL NO 1 | 23. UNION PACIFIC MACHINERY DOCK |
| 4. CLARK & WILSON LUMBER CO DOCK | 24. ALBINA DOCK |
| 5. LIBERTY PETROLEUM CO | 25. MUNICIPAL TERMINAL NO 2 |
| 6. RICHFIELD OIL CO | 26. LUCKENBACH TERMINALS |
| 7. GENERAL PETROLEUM CORP. | 27. ADMIRAL LINE TERMINAL |
| 8. SUNSET PACIFIC OIL CO | 28. CROWN HILLS DOCK |
| 9. PORTLAND LUMBER MILLS DOCK | 29. IRVING DOCK & GRAIN ELEVATOR |
| 10. DRY DOCK | 30. WAREHOUSE DOCK |
| 11. PENINSULA DOCK | 31. ALBANY TERMINAL |
| 12. WESTERN OIL & REFINING CO | 32. MY CORNICK TERMINAL |
| 13. SHELL OIL CO | 33. GLOBE DOCK & GRAIN ELEVATOR |
| 14. STANDARD OIL CO | 34. S. P. OPEN DOCK |
| 15. UNION OIL CO | 35. HUDSON-DUNCAN DOCK |
| 16. THE TRIM CO | 36. MUNICIPAL TERMINAL NO 3 |
| 17. OCEANIC TERMINALS | 37. STARK STREET BOAT LANDING |
| 18. KERR-SIFFORD DOCK & GRAIN ELEVATOR | 38. LUMBER DOCK |
| 19. NORTHWESTERN DOCK & GRAIN ELEVATOR | |
| 20. OREGON-WASHINGTON DOCK | 39. INMAN-POULSEN LUMBER CO DOCK |

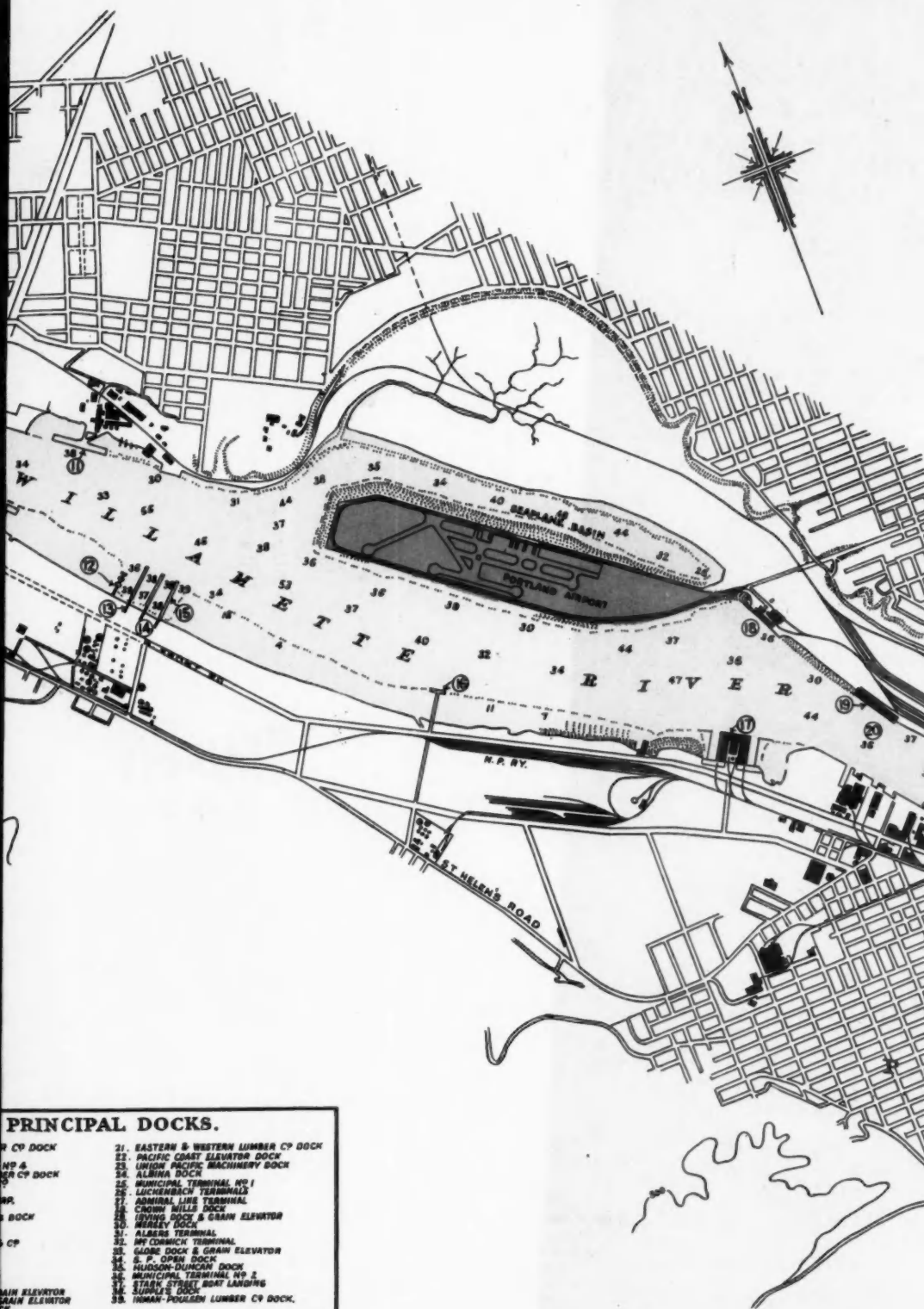
SCALE.



TO THE DOCK AND HARBOUR AUTHORITY, NOVEMBER,

LAND, OREGON, U.S.A.

MISSION OF PUBLIC DOCKS, PORTLAND, OREGON.

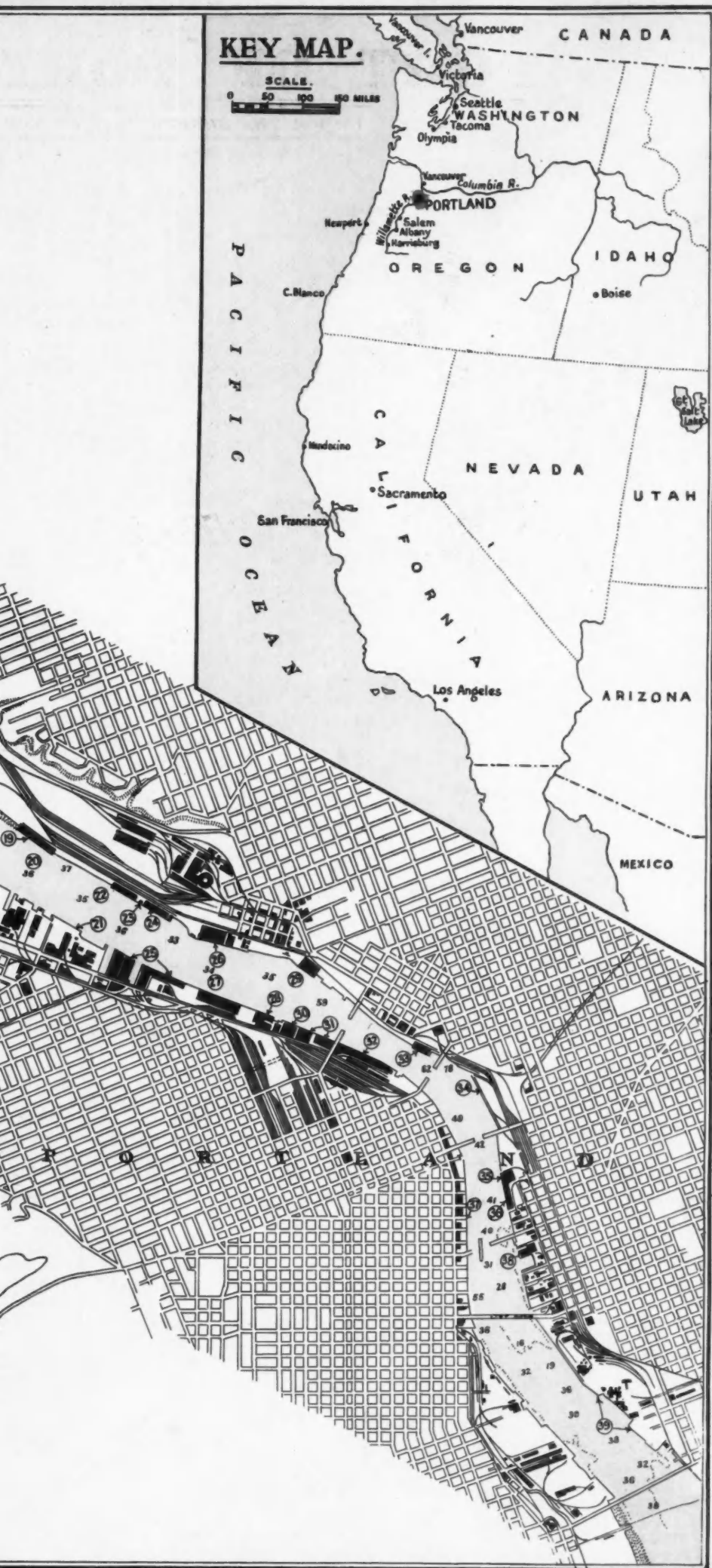


PRINCIPAL DOCKS.

- | | |
|-------------------------------------|--------------------------------------|
| 1. EASTERN & WESTERN LUMBER CO DOCK | 21. EASTERN & WESTERN LUMBER CO DOCK |
| 2. PACIFIC COAST ELEVATOR DOCK | 22. PACIFIC COAST ELEVATOR DOCK |
| 3. UNION PACIFIC MACHINERY DOCK | 23. UNION PACIFIC MACHINERY DOCK |
| 4. ALBINA DOCK | 24. ALBINA DOCK |
| 5. MUNICIPAL TERMINAL NO 1 | 25. MUNICIPAL TERMINAL NO 1 |
| 6. LUTHERBACH TERMINAL | 26. LUTHERBACH TERMINAL |
| 7. ADMIRAL LINE TERMINAL | 27. ADMIRAL LINE TERMINAL |
| 8. CHERRY HILLS DOCK | 28. CHERRY HILLS DOCK |
| 9. LEVING DOCK & GRAIN ELEVATOR | 29. LEVING DOCK & GRAIN ELEVATOR |
| 10. WHEATLEY DOCK | 30. WHEATLEY DOCK |
| 11. ALBANY TERMINAL | 31. ALBANY TERMINAL |
| 12. WY CONRAD TERMINAL | 32. WY CONRAD TERMINAL |
| 13. GLAD DOCK & GRAIN ELEVATOR | 33. GLAD DOCK & GRAIN ELEVATOR |
| 14. S. P. OPEN DOCK | 34. S. P. OPEN DOCK |
| 15. HUDSON-DUNCAN DOCK | 35. HUDSON-DUNCAN DOCK |
| 16. MUNICIPAL TERMINAL NO 2 | 36. MUNICIPAL TERMINAL NO 2 |
| 17. STARK STREET BOAT LANDING | 37. STARK STREET BOAT LANDING |
| 18. LUMBER DOCK | 38. LUMBER DOCK |
| 19. INMAN-POULSEN LUMBER CO DOCK | 39. INMAN-POULSEN LUMBER CO DOCK |

SCALE.





PORT OF PORTLAND, ME.

UNDER THE JURISDICTION OF THE COMMISSIONER OF FISHERIES



TIDE TABLE	
TIME	HEIGHT
12:00	10.0
1:00	9.5
2:00	9.0
3:00	8.5
4:00	8.0
5:00	7.5
6:00	7.0
7:00	6.5
8:00	6.0
9:00	5.5
10:00	5.0
11:00	4.5
12:00	4.0
1:00	3.5
2:00	3.0
3:00	2.5
4:00	2.0
5:00	1.5
6:00	1.0
7:00	0.5
8:00	0.0
9:00	0.5
10:00	1.0
11:00	1.5
12:00	2.0
1:00	2.5
2:00	3.0
3:00	3.5
4:00	4.0
5:00	4.5
6:00	5.0
7:00	5.5
8:00	6.0
9:00	6.5
10:00	7.0
11:00	7.5
12:00	8.0

The Port of Portland, Oregon, U.S.A.



Photo]

Airport at the Port of Portland. Mount Hood in left background.

[Brubaker Aerial Surveys,
Portland, Oregon



U.S.S. Concord passing under St. John's Bridge, Portland, Oregon, September 10th, 1932.

The Port of Portland, Oregon—continued

GRAIN ELEVATOR			
Description			Completed
Operating House and Storage Bins ...	...	...	June, 1919
New Storage Bins...	...	...	September, 1930

Analysis of the total annual expense for maintenance of plant over the past ten years, as listed hereunder, shows that a marked increase began in 1926 along with the normal depreciation of the structures as indicated in the preceding table. The peak of the maintenance, reached in 1928, has been passed, as indicated by the estimate of not to exceed \$120,000.00 annually up to and including 1935. Exclusive of the regular maintenance requirements, provision has been made to take care of the greater depth under the 35-ft. channel project recently authorized; in the case of the Commission's wharves, bulkheading and dredging to conform to this latest depth of channel, will entail added expenditures estimated at \$380,000.00, to be spread out over a period of years and to be included in the annual maintenance estimates.

Year	Maintenance of Plant—All Terminals			
1922	\$ 34,994.83
1923	37,586.45
1924	43,528.72
1925	56,655.78
1926	106,291.45
1927	160,027.21
1928	219,218.03
1929	187,570.92
1930	212,674.19
1931	103,005.44
Total	\$1,161,553.32
Average per Year	116,155.83

At present the Commission has on hand sufficient funds to take care of its normal maintenance requirements for 1932 and 1933 in addition to an emergency reserve of \$245,000.00 with which to meet unexpected contingencies. Attention is also called to the high state of upkeep maintained at the public terminals at low average annual costs. To-day the structures are in fully as good condition as when originally built, thus eliminating any allowance for depreciation of capital investment.

No new important harbour developments have been undertaken this year, but with the early anticipated revival of world trade and the improvement in economic conditions it is to be hoped that the peoples of the Orient may settle their differences and again turn towards the peaceful pursuits of trade and commerce. Then will the Pacific Era materialize and the potential markets of the Far East, with their millions of consumers, become a reality. Then will the Port of Portland, with its unsurpassed terminal facilities, be ready and able to meet the burden imposed upon it by shipping and to attain that pre-eminence position as a world port to which it is so justly entitled by the endowments of nature and the far-sighted vision of its port and ship minded civic leaders.

Description of Terminals

Terminal No. 1.

The services for which Terminal No. 1 is used are for European, coastwise, inter-coastal and Trans-Pacific domestic traffic and the berths allow space for the mooring of five vessels at one time. Regarding storage space at this terminal, the area under cover amounts to 349,600 sq. ft., and 78,500 sq. ft. in the open. The railway trackage allows for 91 cars under working capacity, but can accommodate 140 cars, although the available space at ship-side only allows for 24 cars.

The equipment at this terminal includes a 20-ton locomotive crane, gasoline and electric tractors, cargo masts, freight and marine elevators, adjustable ramps, etc. The various quays and piers at Terminal No. 1 together with their length and transit shed accommodation are as follows:—

	Length	Transit Shed
Quay Dock—Berthing space (Harbour)	955 lin. ft.	147 x 935 ft.
Quay Dock—Lower level	—	100 x 306 ft.
Pier "A"—Berthing space (Slip)	484 lin. ft.	176 x 322 ft.
Pier "B"—Berthing space (Slip)	500 lin. ft.	187 x 494 ft.
Pier "B"—Berthing space (Harbour)	457 lin. ft.	—
Warehouse No. 1	Storage Shed	190 x 200 ft.
Gear Locker	—	48 x 180 ft.

Terminal No. 2.

Terminal No. 2 is utilised for coastwise and local river traffic and the berthing space available can accommodate only one vessel at the time, the length of the berth being 526 lineal feet, and there is also a transit shed at the berth measuring 100-ft. by 526-ft.

This terminal has a shed area of 52,000 sq. ft. at upper level and 53,100 sq. ft. at lower level, and also 50,000 sq. ft. of open storage space. The railway trackage can accommodate 20 cars with a working capacity for 15 cars and the equipment

at this terminal includes gasoline tractors, freight elevators and adjustable ramps.

Terminal No. 4.

The services undertaken at this terminal comprise the Trans-Pacific traffic, both Domestic and Trans-Continental, full cargoes in all trades, and the handling of bulk commodities such as grain, coal, vegetable oils, etc., for which special facilities are provided. For the storage of goods there is covered space extending to 586,360 sq. ft., and open storage space comprising 211,140 sq. ft. The railway trackage available at this terminal can accommodate 800 cars with a working capacity for 425 cars and capacity at ship side for 130 cars.

The equipment comprises two locomotive cranes (of 15 tons and 25 tons capacity), one gasoline crane (2 tons capacity), switch engine, tractors, marine elevators, cargo masts, gravity and power conveyors, etc.

The piers situated at this terminal, together with their length and transit shed accommodation are as follows:—

	Length	Transit Shed
Pier No. 1 (main pier)—Berthing space (Slip)	1,500 lin. ft.	180 x 1,500 ft.
Pier No. 1 (main pier)—Lower level	—	105 x 638 ft.
(Harbour Extension)—Berthing space (Harbour)	605 lin. ft.	150 x 328 ft.
Pier No. 2—Berthing space (Slip)	1,500 ft.	166 x 715 ft.
Berthing space (Harbour)	326 ft.	—
Pier No. 5—Berthing space (Slip)	900 ft.	—
Berthing space (Harbour)	665 ft.	—
Open Wharf	—	99,840 sq. ft.

The bunkers and bulk storage plant at Terminal No. 4 adjoin Pier No. 5 and have a storage capacity of 10,000 tons and are utilised for coal, concentrates, ore, phosphate rock and other bulk commodities. The equipment for unloading and handling facilities includes conveyor belts, travelling ships towers, and box car unloader (car tipper), all the machinery being electrically driven.

The bulk oil and storage plant is located adjacent to Piers 1 and 2 and has a storage capacity of 1,486,800 gallons in 14 steel tanks. These are utilised for bulk vegetable oils and molasses.

The equipment comprises heating plant, two 60-ton steel tank scales, electric pumps (including a two-stage turbine sinking type ship pump with capacity of 165 tons bulk oil per hour), compressed air and steam plant, and facilities for barreling or bulking oil, loading cars and cleaning tank cars. Double mains from plant to Piers 1 and 2.

The cold storage plant adjoins Pier No. 1 and has a capacity for 110,000 boxes of apples, and adjacent to this plant is the fruit warehouse which has a capacity for 250,000 boxes of apples.

Adjacent to Pier No. 1 is the bulk grain elevator constructed of reinforced concrete and with a capacity of approximately 2,000,000 bushels. The car unloading capacity (bulk) is 15,000 bushels per hour and the ship loading capacity (bulk) is 30,000 bushels per hour. Part of Pier No. 1, designated as Grain Section of Pier, is equipped with sacking-out facilities, belt conveyors connecting with elevators and appliances for unloading, handling and cutting in sacked wheat. A two-belt shipping gallery connecting with elevator extends the full length of Pier No. 1. It is equipped with eight movable trippers and fourteen loading spouts.

Bremen Shipping Notes

Modernisation of Freihafen I. Bremen

Like Hamburg, Bremen is at the moment negotiating with the Reich regarding the execution of work in her harbours from funds connected with the new scheme for the creation of work. The wishes of Bremen, which concern the harbours themselves and the roads and railways in Bremen City and Bremerhaven, will not be able to be absolutely fulfilled, due to the limitation of the funds available. The negotiations have therefore, for the present, been limited to the reconstruction of a 500 metre long stretch of Hafen I. The water depth and equipment of Hafen I, the oldest Bremen harbour basin, no longer meet the requirements of present-day traffic. For this reason the reconstruction of a whole harbour side has been contemplated for many years.

In addition, Bremen has asked for further funds from the road construction programme of the Reich, in order to make the Bremen-Bremerhaven road lying in the Bremerhaven harbour district suitable to the requirements of express traffic.

It is reported that the negotiations have reached a not unfavourable stage, but the questions of interest and amortisation require further consideration.

The Port of New York

Latest Data issued by the Bureau of Commerce

New York State Barge Canal.

THE tonnage and shipping on the New York Barge Canal system has been rapidly increasing. In the year 1931, 3,722,012 tons were handled as compared to 1,159,270 tons in 1918, the first year of operation. On the divisions connecting the Great Lakes and the Hudson River (via Buffalo and Oswego) the tonnage in 1931 was nearly five times that of 1918. Two years of general business depression failed to halt the increase in tonnage. The Erie and Oswego Divisions made a joint gain of approximately 37 per cent. in 1931 as compared to 1929. The tonnage of manufactured products, which includes refined sugar and petroleum products, in 1931, was reported by the Superintendent of Public Works, at 1,836,829 net tons. This figure exceeds by 260,000 tons an estimate of prospective tonnage as of 1938 made by the Engineers of the U.S. War Department in a report filed two years ago.

New and larger equipment is being added to the fleets operating on the canal. As a result the capacity of the largest craft now operating on the canal is 2,000 tons as compared with 30 tons in 1825 when the canal was opened for navigation by mule-towed barges. At the close of the 1931 season the Superintendent of Public Works reported 11 modern steel self-propelled cargo vessels as against 6 in 1929. During the same period the self-propelled tank ships increased from 14 to 20.

These facts were placed before a special board of United States Army Engineers at the hearing in Albany on August 25th. This Board is preparing a report on the advisability of Federal participation in the improvement of the canal without transfer of title from the State as a result of a resolution from the Rivers and Harbors Committee of Congress. The proposed improvement of the canal by deepening to 14-ft. between locks, raising bridges to the minimum of 20-ft. and progressive widening will permit materially heavier loading of ships, increased speed, a lower fuel cost, and the advantage of lower overhead, which will result from building boats capable of operating on Atlantic coastal waters during the closed canal season.

These improvements will be mainly for the benefit of interstate commerce since it is estimated that 83 per cent. of the traffic goes beyond the borders of the State. It seems fair that the Federal Government should shoulder the financial responsibility of these needed improvements because of the interstate character of the benefits and the fact that the state has already expended \$175,000,000 in the construction of this waterway for the use of the nation's commerce. Evidence of extensive usage by shippers throughout the entire Great Lakes section and mid-west of the United States, as well as the Atlantic seaboard from Boston to Hampton Roads in the movement of sugar, canned goods, sulphur, petroleum products, grain, automobiles and a wide variety of miscellaneous products was produced at the hearing.

A procedure whereby the Federal Government would adopt a master plan of further improvement of the canal for the benefit of national commerce to be carried out through the State of New York in the same manner as Federal-State co-operation on highway improvement, was urged upon the Engineers' Board. Such improvements would be taken care of by allocation of funds from the annual War Department appropriation act for Rivers and Harbours, for which the people of the State of New York contribute a large percentage in Federal taxes.

Bills to carry out such a programme were introduced in Congress last February and March by Congressman Gavagan and Senator Wagner. The improvement would be of benefit to users of water transportation all along the Atlantic seaboard and Great Lakes.

Value of Foreign Trade at the Port of New York.

The value of foreign trade at the Port of New York during the month of July, 1932, amounted to \$72,814,000, which was a 52 per cent. drop from the July, 1931, figure of \$151,867,000. Exports were \$35,157,000 as compared with \$67,051,000 in the same month last year, a falling off of 48 per cent. The value of imports was \$37,657,000 as against \$84,816,000 in July of last year. This decline of 56 per cent. in value of imports marks the first instance since April, 1931, that the percentage drop of imports exceeded that of the exports. The sharp drop in imports is found largely in crude oil, petroleum products, and unrefined copper, upon which new import duties became effective on June 21. The import decline also reflects

a drop in coffee receipts on account of disturbed political conditions in Brazil.

	1932	July	1931	Net Change	
	\$		\$	Amount	Per Cent.
Exports	35,157,000		67,051,000	-31,894,000	-47.6
Imports	37,657,000		84,816,000	-47,159,000	-55.6
Exports and Imports	72,814,000		151,867,000	-79,053,000	-52.0

Foreign trade at the Port of New York in July represented in point of value 39 per cent. of the total of all ports in the United States.

For the first seven months of the year the decrease in the value of exports and imports at the Port of New York, as compared with the same period last year, was 42 per cent. The decline in value of exports was 49 per cent., and of imports 34 per cent.

	1932	January-July	1931	Net Change	
	\$		\$	Amount	Per Cent.
Exports	292,181,000		568,247,000	-276,066,000	-48.6
Imports	405,284,000		618,430,000	-213,146,000	-34.5
Exports and Imports	697,465,000		1,186,677,000	-489,212,000	-42.0

An analysis of reports of the United States Department of Commerce showing the value of foreign trade at the Port of New York with respect to origin and destination from and to the major sub-divisions of the world, shows that Europe is our best customer. During the fiscal year ending June 30, 1932, 45 per cent. of the foreign trade of the port was with that continent, European countries taking 56 per cent. of the exports, and supplying 38 per cent. of the imports. Asia and South America are next in importance, accounting for 24 and 16 per cent., respectively, of the foreign trade of the port.

The percentage distribution of the value of the foreign trade of the port with the continents of the world in the fiscal year 1932 was as follows:—

Distribution of the Value of Foreign Trade, Port of New York, Fiscal Year 1932.

	Exports	Imports	Exports and Imports
	Per Cent.	Per Cent.	Per Cent.
Europe	55.6	38.1	45.0
North America ...	11.7	9.5	10.4
South America ...	11.6	19.1	16.4
Asia	13.4	30.6	23.5
Oceania	2.0	0.7	1.2
Africa	5.7	2.0	3.5
	100.0	100.0	100.0

The percentage decrease in the value of foreign trade of the Port of New York by continental divisions is shown in the following table:—

Percentage Decrease in Value of Foreign Trade at the Port of New York by Continents. Fiscal Year 1932 compared with 1931.

	Exports	Imports	Exports and Imports
	Per Cent.	Per Cent.	Per Cent.
Europe	-41.5	-26.2	-34.7
North America ...	-38.7	-26.1	-32.4
South America ...	-58.8	-17.0	-36.0
Asia	-27.0	-21.6	-23.0
Oceania	-47.9	-26.5	-42.1
Africa	-34.1	-40.1	-36.2

The greatest percentage loss in exports is to South America, though the decrease in imports from that continent is the lowest. Africa furnishes the only instance where the decrease in imports is greater than the exports.

Vessel Movements in Foreign Trade.

The number of foreign trade entrances and clearances of vessels at the Port of New York during August, 1932, while higher than the previous month, are still below the August, 1931, figures.

	1932	August	1931	Net Change	
				Amount	Per Cent.
Entrances, No. of Vessels ...	400		541	-81	-15.0
Clearances, No. of Vessels ...	446		531	-85	-16.0
Entrances, Net. Reg. Tonnage	2,494,315		2,786,153	-291,838	-10.4
Clearances, Net. Reg. Tonnage	2,382,535		2,739,919	-357,384	-13.0

The 400 entrances included 41 in ballast and 419 with cargo, and of the clearances 82 were in ballast and 364 with cargo.

The Port of New York—continued

Entrances and clearances for the first eight months of this year, compared with the same period last year, are as follows:

	January-August		Net Change	
	1932	1931	Amount	Per Cent.
Entrances, No. of Vessels ...	3,576	4,013	-437	-10.9
Clearances, No. of Vessels ...	3,660	4,167	-507	-12.2
Entrances, Net. Reg. Tonnage	18,720,152	20,074,666	-1,354,514	-6.7
Clearances, Net. Reg. Tonnage	18,776,934	20,408,719	-1,631,785	-8.0

Commerce at Port Newark.

The receipts of cargo by vessel at Port Newark in the month of August, 1932, amounted to 22,045 tons in comparison with 57,609 tons in the same month last year, a falling off of 62 per cent. This tonnage included 7,866,861 board feet of lumber which represented a decline of 56 per cent. from the August, 1931, figure. Shipments out of Port Newark by vessel continue to be greater than last year. In August, 1932, this movement amounted to 5,199 tons as compared with 3,136 tons in the same month a year ago, being a gain of 66 per cent. Twenty-seven steamers arrived at Port Newark during the month as compared with 14 in the same month last year.

A comparison of the volume receipts by vessel during the first eight months of 1932 and the same period last year is as follows:—

Water-Borne Receipts at Port Newark.

	January-August		Net Change	
	1932	1931	Amount	Per Cent.
All Commodities (Tons) ...	247,735	355,074	-107,339	-30.2
Lumber (Board Feet) ...	75,227,000	129,674,000	-54,447,000	-42.0
Other Commodities (Tons)	135,045	160,563	-25,518	-15.9

Inland shipments of lumber from Port Newark amounted to 12,874,000 board feet, of which 4,235,000 moved by railroad and 8,639,000 feet moved by truck. Inland shipments out of Port Newark, by railroad and truck, of merchandise other than lumber amounted to 10,237 tons, which was 60 per cent. less than last year's figure of 25,840 tons.

Steamship Sailings.

The tabulation of August sailings illustrates the curtailment that has been made in the regular foreign services out of this port. Against a total of 383 scheduled foreign sailings recorded in August, 1931, the August, 1932, figure is 301. Most of the decrease took place in sailings to Europe, South America and the West Indies. Special cruises in foreign waters, however, continue to increase over last year.

In the domestic trade, sailings to New England via Long Island Sound, dropped from 442 reported for August, 1931, to 336 for that month of this year, a decrease of almost 25 per cent. This is due to the discontinuance of certain lines formerly serving the smaller New England ports.

Saturday, August 20th, was the peak day of the month with a total of 69 sailings from this port. Foreign service accounted for 35 of these, including 5 to United Kingdom and North European ports, 3 to Italy, 2 to Spain, 1 to South Africa, 8 to the West Indies and Mexico, 3 to South America, 3 to the Far East, 4 cruises and 2 tankers.

Grain Exports.

Exports of domestic and Canadian grain from the Port of New York during July, 1932, were 3,317,000 bushels, which is a decline of 40 per cent. from the July, 1931, figure of 5,498,000 bushels. Exports of domestic grain increased 128 per cent. over the same period of last year, while the Canadian grain in transit fell off 56 per cent.

	July 1932	July 1931	Net Change	
	Bushels	Bushels	Amount	Per Cent.
Domestic and Canadian Grain	3,317,000	5,498,000	-2,181,000	-39.7
Domestic Grain ...	1,110,000	486,000	+624,000	+128.4
Canadian Grain ...	2,207,000	5,012,000	-2,805,000	-56.0

For the first seven months of 1932 the exports of grain from the Port of New York amounted to 27,741,000 bushels, of which 9,635,000 bushels were domestic, and 18,106,000 bushels were Canadian grain. Although there was a decided increase in the domestic grain exported, amounting to 197 per cent., the falling off in Canadian grain made a net decrease for the period of 28 per cent. compared with the first seven months of 1931.

	January-July		Net Change	
	1932	1931	Amount	Per Cent.
Domestic and Canadian Grain	27,741,000	38,635,000	-10,894,000	-28.2
Domestic Grain ...	9,635,000	3,247,000	+6,388,000	+196.7
Canadian Grain ...	18,106,000	35,388,000	-17,282,000	-48.8

Receipts of Grain and Visible Supply at the Port of New York.

The volume of grain, including domestic and Canadian, received at the Port of New York during the month of August, 1932, was 2,991,338 bushels, which, compared with 5,136,471 bushels received in the same month last year indicates a falling off of 42 per cent. The railroads delivered 218,800 bushels, while 2,772,538 bushels were routed to New York via the canal.

Receipts (Bushels).

	August 1932	August, 1931	Net Change	
			Amount	Per Cent.
All Grain ...	2,991,338	5,136,471	-2,145,133	-41.7
Wheat ...	2,315,627	4,833,171	-2,517,544	-52.0
Barley ...	1,700	—	+1,700	—
Corn ...	474,561	77,300	+397,261	+513.9
Oats ...	194,350	226,000	-31,650	-14.0
Rye ...	5,100	—	+5,100	—

Receipts for the first eight months of this year, January to August, compared with those of the same period last year were as follows:—

Receipts (Bushels).

	January-August		Net Change	
	1932	1931	Amount	Per Cent.
All Grain ...	25,712,314	40,369,603	-14,657,289	-36.3
Wheat ...	21,575,686	34,405,103	-12,829,417	-37.3
All Other ...	4,136,628	5,964,500	-1,827,872	-30.6

Of the total volume of grain received at the port during the period January to August, 12,114,722 bushels were routed via the canal, which is 38 per cent. less than the 19,558,732 bushels received in the same period a year ago. The volume received via railroad was 11,899,400 bushels, compared with 16,798,200 bushels last year, a decline of 32 per cent.

The visible supply of grain in the port, both in elevators and afloat, on September 3, 1932, was 3,452,000 bushels, which was 24 per cent. less than the supply on August 29, 1931, the nearest comparable date last year.

Visible Supply (Bushels).

	Sept. 3rd 1932	Aug. 29th 1931	Net Change	
			Amount	Per Cent.
All Grain ...	3,452,000	4,550,000	-1,098,000	-24.1
Wheat ...	2,727,000	4,387,000	-1,660,000	-37.8
Barley ...	4,000	25,000	-21,000	-83.8
Corn ...	181,000	1,000	+180,000	+18,000.0
Oats ...	192,000	81,000	+111,000	+137.0
Rye ...	318,000	56,000	+292,000	+521.4

Copenhagen Exhibition

Exhibits of Messrs. Ruston-Bucyrus, Ltd., and Ruston and Hornsby, Ltd.

The illustration below shows the exhibits of Ruston and Hornsby, Ltd., and Ruston-Bucyrus, Ltd., at the above exhibition. The stand was in charge of their distributor for Denmark, Mr. E. T. Grew, Raadmandsgade 43, Copenhagen, and the



exhibits comprised: "Ruston-Bucyrus" $\frac{3}{4}$ yard Diesel Excavator with Shovel equipment; "Ruston" Crude Oil Road Roller; "Ruston" Crude Oil Locomotive, 16 h.p.; "Ruston-Hornsby" Class HR Oil Engine; "Ruston-Hornsby" Class PB Petrol-Paraffin Engine; "Ruston-Lister" VQM Marine Oil Engine; "Ruston-Lister" JPM Marine Oil Engine.

Notes from the North

Beginning of Liverpool's Docks.

THE story of Liverpool's first wet dock is told in the memoirs of Thomas Steers, by Mr. Henry Peet, who has just made a useful addition to the records of the port of Liverpool. Steers had in his time a great knowledge of drainage, wharves, sluices, and flood-gates, and the dock gates, which were used to hold up the water in connection with inland navigation, but had never been applied to tidal estuary until his bold experiment on the Mersey. After experience in the dock-making at Rotherhithe, he came to Liverpool. He was appointed dock master, then later water bailiff also; he became a member of the Council, was elected one of the town's bailiffs, and he began the construction of his second great basis, the subsequent Canning Dock. He leased from the Corporation three-quarters of a mile of foreshore, on which he built a wooden pier, and subsequently a stone one, out from the new dock; he saw to the proper buoying of the Hoylake channel, and the proper approaches to the port, and frequently visited Ireland to advise the Newry Navigation Commissioners, and at the same time survey the River Boyne. It was in 1708 that the first suggestion of a wet dock for Liverpool was made. Then the Corporation agreed to expend in helping to make a dock a sum not exceeding £500 and later a Parliamentary Bill received the Royal assent. The Town Council decided "to proceed to the making of the said dock . . . as now sett out by Mr. Thomas Steers, of the City of London, who is brought down on purpose, and has surveyed and staked out the same nearer to the sea than sett out before."

Dock Board Official's Retirement.

Mr. H. L. Roxburgh, chairman of the Finance Committee of the Mersey Docks and Harbour Board, speaking at a recent meeting, referred to the retirement of the Dock treasurer, Major A. Dranfield. Major Dranfield, he said, had been in the service of the Board for half a century, for fifteen years of which he had been treasurer. The Board's revenue in 1881, when Major Dranfield entered the service was £966,000; while for the last financial year, 1931, it amounted to £2,212,000. Mr. Thomas Rome, who presided, endorsed the tribute paid to Major Dranfield.

Mersey Tunnel Finances.

Financial aspects of the Mersey Tunnel scheme have been occupying a great deal of attention lately, and it has been decided by the Corporations of Liverpool and Birkenhead to promote a bill in the next session of Parliament to extend the Mersey Tunnel toll period. The extension to be sought is from twenty-five to forty years (or such other period as may be deemed necessary) in order to defray excess expenditure on the undertaking. The bill will aim also at limiting the Liverpool rate contribution to 5½d. in the pound, and extending the Tunnel Joint Committee's borrowing powers. The Committee has adopted as its policy the maintenance, as far as possible, of the original figure of 4d. (or, under de-rating, 5½d.) in the pound as the rate aid towards the cost of the undertaking. The Committee is still pressing its claims on the Government for a further grant, but, in the meantime a reconstruction of the financial scheme of 1925 is necessary. On the basis of a rate subsidy of not more than 5½d. in the pound, the following provisions are requisite:—(a) The excess capital expenditure, taking about £1,500,000 for engineering works at this stage as representing this factor, will have to spread over 80 years—the same period as the original capital estimate of £5,000,000. (b) The tolls will need to be called upon to furnish about £138,000 a year over the whole period of 80 years, to allow for £10,000 a year as the costs of collecting the revenue and leave £128,000 in relief of rates. (c) That in order to yield this contribution, and yet avoid having to levy tolls for as long as 80 years, the tolls may have to be levied for about 40 years and all revenue from tolls above £138,000 in any year must be set aside in a fund (called in the Tunnel Acts the "Loans Equalisation Fund") until it contains about £4,000,000 in, or about, the 40th year, and so provide an annuity of £128,000 a year for the remaining years up to 80. (d) That in order to build up such a fund, the tolls actually collected per annum over 40 years will have to be about £190,000, of which £128,000 net would be applied in relief of the burden on the rates, in each year, and the tolls collected over that amount would go into the fund for accumulation and use in the years 41 to 80 of the loan redemption period. (e) That the tolls may also have to be called upon for a further purpose, namely, the provision of a reserve or renewal or replacement of the machinery—for ventilation, for instance—which will not have a useful or economic life of 80 years. The

yield from tolls can only be a matter of judgment, on the best available data, but it is necessary to make it clear that it is only by reliance upon the tunnel taking considerably more vehicular traffic than that now using the Birkenhead ferries that the required yield of toll can be realised. The Committee is making every effort to keep the cost within the provision mentioned, but in such technical matters as engineering and ventilation they are bound to be guided by their expert advisers and only when the tunnel is open and working satisfactorily can the capital amount be finally closed.

Gravel Crushing Plant.

Plant is being put down at Point of Ayre, Isle of Man, for the production of crushed gravel which will be loaded into the boats on the spot and exported. Hundreds of thousands of tons of gravel of the best commercial quality are available at this part of the coast. The provision of a loading jetty at this exposed part of the coast gave rise to some difficulty at first, but the problem was solved by securely berthing the hull of an old concrete ship well inshore, and using it as the foundation for the loading structure, which was built on it. The industry is expected to employ a considerable number of workers during the winter months.

New Drainage Board.

There has just been established for the area between the rivers Wyre and the Lune an Internal Drainage Board, which has an initial spending power of £3,000 to construct and revise existing water courses to check flooding, and an annual maintenance sum of £750. At a meeting called to consider the work in hand, Mr. Procter said that while the idea was good, it was no use giving exclusive attention to the inland areas and neglecting the sea banks. The tidal gates at Cockerham had been under his supervision for 40 years, he had never received one penny towards their upkeep from any authority. On hearing that the scheme was not to include the sea banks, Mr. Procter exclaimed: "Well, what is the good of spending thousands of pounds, improving the internal drainage, when the banks will be left untouched? If the occupier neglects the banks the water will flood the land as before." Mr. Procter added that the estuary was silting up to the extent of 1½-in. a year. It must be kept open to allow the water to clear quickly. That was a cause of flooding. The Chairman said everyone would have to contribute towards the cost, but cottagers would be required to pay only one-third of the total of the land occupiers' charges.

Wallasey Sea Wall.

When the high tide broke through the temporary sea wall at New Brighton and flooded the excavations which are to form the Marine Lake, two cranes were partially submerged and buckets and wooden beams could be seen floating in the flood. Metal girders were bent almost double. Despite the exceptional stress, the permanent sea wall stood up to the strain very well. The massive concrete masonry is 40-ft. deep from coping to foundations, with a base of from 16-ft. to 20-ft. mostly of solid rock. When the tide was at its highest on a recent Sunday with a strong westerly gale behind it, the seas broke against the wall and fell back from the curved coping. Only the spray came over the wall on to the shore side. Further along towards the fort, however, where the wall has not been topped with the coping, the seas came over in great volumes and fell into the concrete workings on the shore side of the wall. As the concrete below the surface had been completed, all that the engineers had to do was to pump away the accumulated water. An official estimate placed the damage at not more than £2,000. No damage was done to the Harrison-drive embankment beyond the breaking away of small portions of asphalt. This embankment, which, of course, is a temporary one only, pending the completion of the whole scheme of foreshore developments, has now been in position nine years and is shortly to be strengthened at an estimated cost of £8,000.

Good progress is being made with the Wallasey foreshore development schemes, which when completed will have cost £1,000,000. Some years are likely to elapse before Wallasey Corporation embarks upon the second portion of the scheme, which will carry the new promenade to Harrison-drive and link up with the Leasowe Embankment. There is every prospect that the marine lake, which is being constructed at a cost of £92,000 as part of the New Brighton promenade development scheme, will be completed and ready for boating early next summer. No fewer than 240 men are employed on the whole £440,000 scheme. The coping-stones are being placed on the last portion of the massive £275,000 sea-defence wall, which extends from the Red Noses to the fort and the reclaimed

Notes from the North—continued

shore is being prepared for the making of the intersecting roads and the garden enclosures abutting on the extended promenade.

New Bascule Bridge.

Another bascule bridge, one of four being built by the Mersey Docks and Harbour Board to cross the docks on the Birkenhead side of the river—and the second to be completed—is now open for vehicular traffic. It was put into commission without any formal ceremony to mark this important step towards the modernising of the bridges along what is known as Tower-road. The new bridge is the largest of the four and is part of the £250,000 dock improvement scheme—which includes the new bridge on the Liverpool side. Old hydraulic horizontal swing bridges which have been in existence since 1886 are being superseded. The new bridge has a span of 100-ft. The other two bridges, of a similar type on the main dock road, one of which has already been in use for some months, have an 80-ft. span. The fourth bridge is across the Morpeth and Egerton Dock passage and will not be finished for some months. Mr. T. L. Norfolk, the engineer-in-chief of the Docks Board, in designing the bridges, has allowed for the increased weights of present-day motor vehicles, and the limit has been increased from 10 tons to 20 tons.

The construction of the third bridge along the main dock road has been in progress simultaneously and for five weeks from November 7th the roadway between Birkenhead and Seacombe will again be closed to permit of the completion of this bridge.

Contracts Let.

New contracts entered into by the Mersey Tunnel Joint Committee are:—For the construction of a traffic plaza at Chester-street, Birkenhead, £26,000, Messrs. McAlpine; for constructional steel work for six ventilation buildings, £119,551, Messrs. Redpath, Brown and Co.; for general building work at the North John-street ventilation station, £102,897, Messrs. Wm. Moss and Sons. On four current contracts work of the value of £3,295,000 has been done, as compared with the contract total of £3,217,951, equal to 102 per cent. The number of men employed is 270. Concrete filling and the fixing of electric light fittings have been completed. The sum of £228,000 has been spent on ventilation works and £32,629 has been certified in respect of ventilation fan contracts amounting to £58,824.

Control of Dangerous Cargoes.

Strict regulations controlling the loading, unloading and conveyance of dangerous goods, such as petrol, petroleum, and other oils are enforced by the Mersey Docks and Harbour Board, which is responsible for the safety of millions of pounds worth of goods in the docks and on the quays and of shipping and the docks. A vessel carrying cargo of this nature in bulk cannot enter dock and must discharge at certain specified jetties. Stringent regulations also govern the lighting arrangements and handling of such cargoes. When these oils are in metal barrels or drums and the cargo is less than 5,000 gallons, vessels may load or discharge in certain docks only. A ship carrying such cargo must fly a red flag not less than three feet square by day and show a special red light by night.

Mersey Foreshore Improvement.

Mr. J. A. Brodie, former city engineer of Liverpool, first conceived the Otterspool embankment scheme which is now in an advanced stage. It has enabled an enormous sum of money (possibly over £100,000) to be saved on the cost of disposing of a million tons of town refuse, and gives promise of a delightful addition to the recreational facilities of Liverpool. A section of the foreshore, including the "Cast-iron" area, has already been filled in and levelled, and it is estimated that in about three years time the remainder of the forty-six acres will have been similarly reclaimed and ready to be laid out as an attractive summer rendezvous. When the rest of the foreshore up to Garston Docks has been enclosed by a like method, an area equal in size to Woolton Woods will have been added to the pleasure lands of the city.

Contractors' Merger.

Messrs. Edmund Nuttall, Sons and Company, Ltd., general civil engineering contractors for the new Mersey Tunnel and other big engineering works, have arranged to co-operate with Messrs. John Mowlem and Co., Ltd., in their civil engineering contracts. For this purpose a company has been registered with a paid-up capital of £250,000 under the name of Edmund Nuttall, Sons and Company, and John Mowlem and Company (Joint) Ltd. They are at present joint contractors for the new graving dock which the Southern Railway are constructing at Southampton with a view to providing accommodation for the new Cunard and similar steamers.

Tunnel Ventilation Shaft.

The Mersey Docks and Harbour Board have approved of the revised scheme of the Mersey Tunnel Joint Committee for the erection of the tunnel ventilation and control station at the Pierhead. Objections by the Works Committee in July last resulted in the preparation of amended plans, designed to meet as far as practicable both the requirements laid down by the Dock Board and the Tunnel Committee. The Works Committee of the Board recommended the approval of the plans provided that the areas immediately to the northward and southward of the proposed buildings should not be used by the Tunnel Committee, the Liverpool Corporation, or their respective assigns, but should be laid out as gardens or in some other ornamental manner, and should not be used for any other purpose whatsoever, without the consent of the board, and that prior to the commencement of the construction of the works, sections and specifications should be submitted to the board for approval.

Veteran Pontoons.

The fact that most of the pontoons at the Woodside landing-stage are over 70 years old was revealed at a recent meeting of the Mersey Docks and Harbour Board, when they had before them a recommendation of the Works Committee to accept the offer of Messrs. Francis Morton and Co., Ltd., to construct 29 steel pontoons for the Woodside and Wallasey Landing Stages. Mr. Edmund Cardner said that at the Woodside Landing Stage there were 33 pontoons, 31 of which were built in 1860, and two in 1897, whilst at the Wallasey stage there were 44 pontoons, 21 of which were built in 1873, and 23 in 1897.

Mostyn Docks.

Mostyn Docks, near Holywell, which constitute "free port" on the estuary of the Dee are experiencing busier times. Being in close proximity to the main Chester-Holyhead L.M.S. Railway, and having their own private sidings, they are within a very short distance of the Chester-Holyhead main coast road. Captain Johnson is the harbour master. Early this year the North Wales Paper Company, Flint, made use of Mostyn Docks for discharging cargoes, and since then several other industrial concerns in Flintshire have also used the docks for similar purposes.

Customs Hours.

Liverpool business men, through the Chamber of Commerce, are supporting the Dock and Harbour Authorities' Association in the endeavour they are making to persuade the Financial Secretary to the Treasury to receive a deputation on the subject of working hours of customs officers at the docks and bonded warehouses. Major Eckes, who presided at the last meeting of the Chamber of Commerce, said communications which had passed between the Financial Secretary to the Treasury and the Dock and Harbour Authorities' Association showed that in the view of the former, there were not sufficient grounds to extend the hours of attendance of Customs officers in docks and bonded warehouses from eight to nine hours a day.

Mr. Marshall Stevens.

Mr. Marshall Stevens, a co-founder of the Manchester Ship Canal Company, who is now in his seventy-ninth year, has resigned from the senior managing directorship of Trafford Park Estates, Ltd. The completion of the Ship Canal was largely his personal triumph and, not content with that, in 1897 he turned his hand to the development of the 1,200-acre Trafford Park Estate, as complementary to his labours for the Ship Canal. As an expert on ports and shipping, Mr. Stevens became a permanent member of the executive of the International Congress on Navigation. As the result of the company's activities there are now established at Trafford Park over 150 works and depôts, supporting a population of over 250,000 and accounting for over 400,000 tons of traffic annually to the docks. An indication of the trade of Trafford Park is that its one small railway carries a tonnage which is more than 3 per cent. of the total general merchandise traffic of all the railways in the United Kingdom. Mr. Stevens, who has been succeeded as managing director of Trafford Park Estates, Ltd., by his son, Col. T. H. G. Stevens, remains not only a great figure in the development of the Port of Manchester, but also as a link with the historical past.

It was stated at the annual meeting of Trafford Park Estates, Ltd., that the balance of profit at the end of the financial year, after making adjustments in respect of income tax, was £32,400. The directors recommended the payment of a dividend of 5 per cent.

The Port of Hamburg (continued from page 379)



Shipyards at Hamburg. The largest in Europe.

The Custom House Clearing Stations.

THE boundary line separating the Free Port from the customs area has a length of about seventeen miles. Its shore portions are guarded, in most places, by strong palisades nearly ten feet high, whose upper half consists of strong iron wire gauze within an iron frame work, whereas their lower half is made of sheets of corrugated iron which are continued for some distance underground so that it is impossible to smuggle any commodities from one area to the other. Where the line crosses the water, it is marked by double wooden fences mounted on wooden or iron floating bodies. These floating palisades are strengthened by groups of posts placed at certain distances from each other.

Some of the customhouse clearing stations are accommodated on pontoons. The floating stations, e.g., those in Niederhafen and Brookthorhafen, are equipped with cranes and are roofed in. Some customhouses, e.g., those in Muggenburger Zollhafen and in Entenwärder Zollhafen, are provided with sheds where the traffic crosses the customs boundary.

Generally speaking, the individual differences between the various customhouses, etc., are so great that a detailed description cannot be given in this place. They are due to local peculiarities and to the nature of the traffic mainly attended to by the stations in question. A feature common to all is that their designs and their equipment are capable of satisfying all the demands of the traffic moving from the Free Port to the customs area and *vice versa*—demands which are sometimes very considerable.

The Kohlbrand Train Ferry.

The requirements expected to be satisfied by the Kohlbrand Train Ferry are particularly great. It stands to reason that the transfer of railroad trucks from the vessel to the shore demands a far greater precision in the construction of all parts than the conveyance of passengers. A special difficulty is presented by the varying level of the water.

The difference between the two extreme levels that have to be taken into account for practical purposes (about 16-ft.) is so considerable that an adjustment cannot be effected by movable bridges, because these—in order not to exceed the maximum angle of inclination admissible for railroad operation—would have to be extremely long. Hence, the adjustment had to be made by the ferry boats themselves, and these had to be constructed accordingly. The carrying deck of each boat is suspended from eight screw spindles by means of which it can be raised or lowered according to the level of the water. It is thus possible to make the carrying deck always level with the shore. The floating body of the boats, in order to comply

with the requirements just described, has been equipped with a tall iron superstructure consisting of four portals and longitudinal reinforcements, and surmounted by the wheel house. The deck is provided with two railroad tracks. It can accommodate six railroad trucks as well as a considerable number of passengers. The boats can carry any other kind of vehicles besides railroad trucks. They are completely symmetrical and have two screws each forward and aft, so that they can land their cargoes, etc., without having to turn—which, owing to the traffic moving up and down the Kohlbrand—is a great advantage. It saves time and increases the safety of the service. Steering is effected from the wheel house by means of the screws, that is to say, from the ship's engines direct. This ensures the free navigability of the boats even when travelling at the low rate required just before landing. Their speed is eight knots.

Driving power is obtained from two steam engines indicating 320 h.p. each.

The landing places provided for the ferry service comprise two recesses built at acute angles to the Kohlbrand banks. They have to guide the boats approaching them without coercion, as it were, until they reach the spot where the trucks can be transferred to the rail connections on shore. For this purpose they are of tapering shape towards the end. The guidance of the boats is effected, first by mooring posts, next by resilient wooden walls, and lastly by masonry shaped so as to conform to the shape of the boats. A slight difference in the levels of the shore and the boats is unavoidable, although the carrying decks of the latter, as has been explained above, are adjustable. It is due to the different weight of the boats before and after taking up their cargoes of trucks. It has therefore been necessary to construct iron bascule bridges 49-ft. long, to effect an adjustment. Moreover, it sometimes happens that one side of the boat carries a much heavier load than the other, so that a certain list must result. This has necessitated flexible connections between the main girders and the cross girders of the bridges to permit the latter to be tilted sideways. So long as the bridges do not rest on the boat, they are suspended, by means of a cross beam, from two winches that can be operated from the boat when landing in such a way as to adjust them to the correct level. Their own weight has been balanced by counterweights.

The Bridges.

Owing to the intricate nature of the network of traffic arteries that intersect the port, both ashore and on the water, the number of bridges is exceedingly large. There are ninety altogether. As there has been a steady increase in the weight of the traffic using them a good many of them have had to be either strengthened or renewed in recent years.

The Port of Hamburg—continued

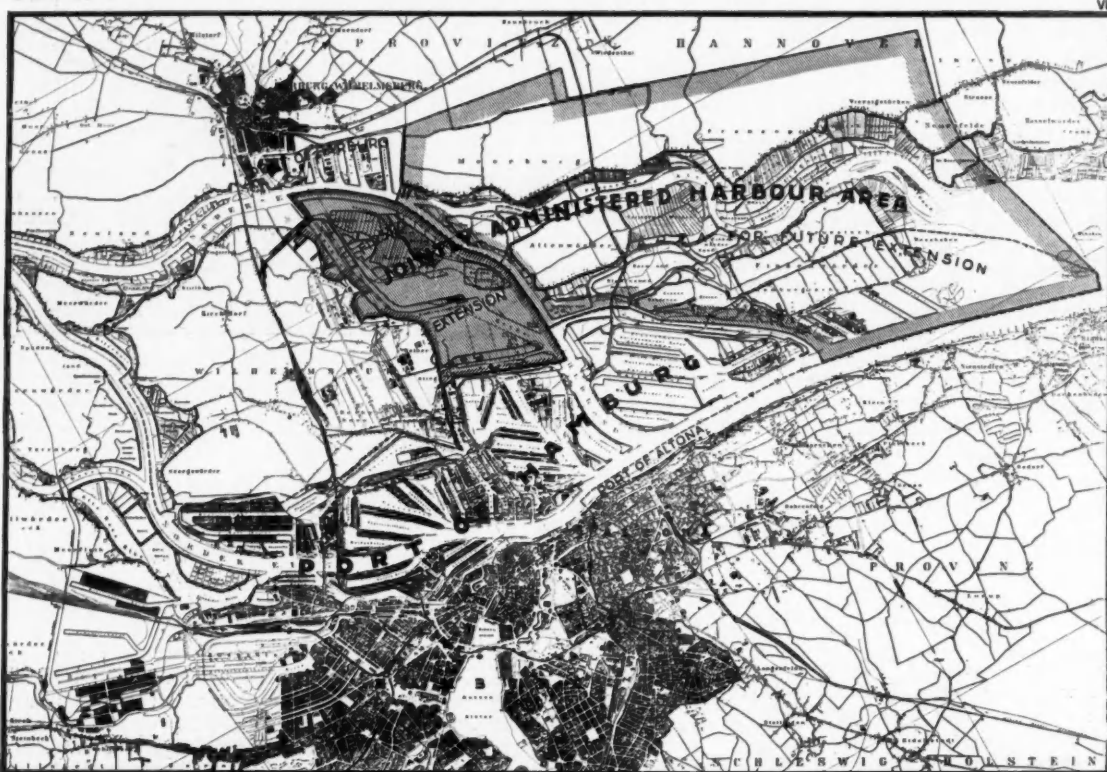
With the exception of the three Elbe bridges they possess no very notable features of their own. Their spans range between 36-ft. and 270-ft.

Each of the bridges built across the main Elbe has three openings about 330-ft. wide, the width of the river in that neighbourhood being about 1,000-ft. Their construction took place at various periods. The oldest of the three, the railroad bridge inside the customs area, was built in 1868-72 and 1889-90; the next in order, viz., the road bridge crossing the river about 650-ft. higher up and likewise situated within the customs area, in 1892, whereas the third—the one situated within the free port—was opened to traffic in 1926. In 1926-27 the old railroad bridge was strengthened by the provision of new superstructures in place of the old ones, and in 1927-28 the road bridge was enlarged by the addition of a second superstructure. Consequently, the difference in the design and type of the three bridges is very considerable, and corresponds to the progress made by engineering science and to the growth of traffic in the course of half a century. The oldest of them was conspicuous, at least until quite recently, for its Lohse girders—a type which is not often met with nowadays and which,

The Elbe Tunnel.

The reason which prompted the construction of the Elbe Tunnel, connecting the St. Pauli and Steinwärder sides of the river, was to do away with the détour road vehicles were compelled to make when proceeding from the city to the western section of the harbour, and to replace the ferry services in the event of dense fog or ice conditions. The distance saved amounts to $7\frac{1}{2}$ miles.

In view of the nearness of the city-built area to the northern, and that of industrial districts to the southern mouth of the tunnel, it was practically impossible to construct inclined approaches leading down to the level of the tunnel bed. Such an arrangement, moreover, would have involved long détours for the brisk direct traffic between the two opposite river banks. For these reasons it was necessary to provide a shaft at each end of the tunnel. Each shaft has a diameter of 72-ft. and a depth of 77-ft. below street level. Each contains six electrically operated elevators whose lifting capacities are as follows: two of 10 tons, two of 6 tons, and two of 2.4 tons each. The four large elevators are used by vehicular traffic, and the other two by pedestrians. The walls of the shafts are provided with



The above Map illustrates the considerable possibilities of Enlarging the Port of Hamburg.

however picturesque and pleasing its effect may be to the eye owing to its beautiful curves, is looked upon with disfavour by modern science as being unremunerative and inadequate to present-day requirements. The same type of girders was employed in the design of the road bridge, because it was thought that, owing to the close vicinity of the two bridges, they ought to be alike in style. The superstructure of the old bridge—which is no longer capable of meeting the demands of modern traffic—has recently been replaced by a more up-to-date construction, of the same type as that of the third bridge, i.e., the one situated in the free harbour, so that the kind of girders selected for the latter, viz., double-hinged arches with horizontal tie member in the roadway (which is located below) now dominates the entire neighbourhood. As regards the Free Port bridge, its bottom boom is intersected by an upper roadway. The distance between the main girders is 55-ft., two-thirds of the useful width being used by road traffic, whereas the remaining one-third is occupied by the single railroad track. For passenger traffic brackets, 16½-ft. wide, have been provided. The upper roadway is intended to accommodate four lines of the track of the projected Port of Hamburg Elevated Railway. The three openings of the bridge required 6,580 tons of ingot steel and 276 tons of cast steel for the bearings.

For the additional superstructure of the road bridge above referred to the system of Lohse girders was selected, just as had been done when the old railroad bridge was built, except that the booms of the new construction are of the solid-web type. The distance between the main girders is 30-ft. 8-in., and the width of the roadway is 24-ft. 8-in. The single cyclists' track, 4-ft. 11-in. wide and the single track for pedestrians, 9-ft. 10-in. wide are supported by brackets.

staircases. The elevators occupy half the area of each shaft, the other half being required to transfer the traffic from them to the subway. Above the road level the two shafts are surmounted by domed buildings whose large windows enable the daylight to reach the bottom of each shaft. Both are built entirely symmetrically, except that the choice of the material for the northern building was made with a view to the architectural style of the adjacent landing stages, whilst that used for the southern building was adapted to the character of the industrial neighbourhood on that side. The upper floor of each accommodates the driving plant for the elevators. As the tunnel leads from the customs area to the Free Port, special custom-house facilities had to be provided at the Steinwärder entrance.

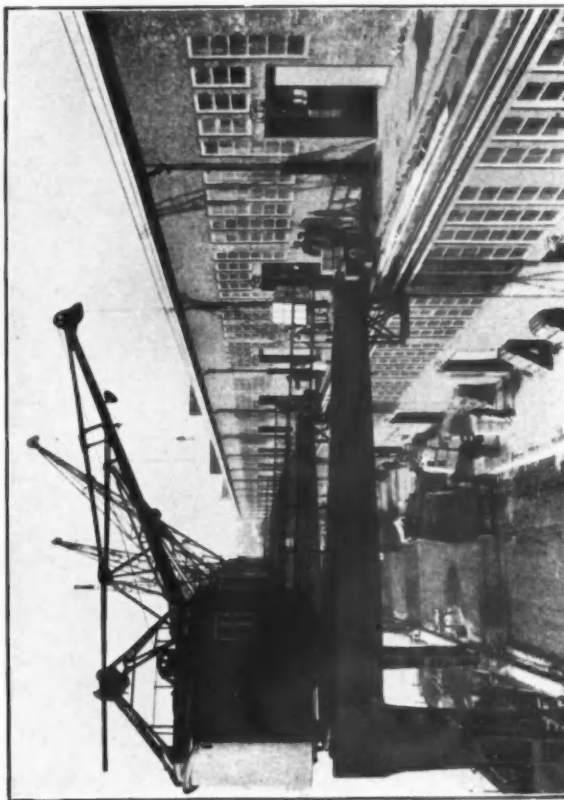
The distance between the centres of the two shafts is 1,470-ft. They are connected by two separate subways, each serving the needs of one direction of traffic. The distance between the centres of the subways is 26-ft. and their outward diameter is 19½-ft. Their walls consist of rings made of 10-in. section iron riveted together, each ring being composed of six circular segments. They are surrounded by a layer of cement and packed with lead. The space available for the traffic in the subways has been suitably shaped by the provision of a concrete walling. Light and power cables, telegraph and telephone lines, pneumatic post tubes, and water piping are all accommodated in the side walls and in the bottom part of each subway. The remaining space is 15½-ft. wide and 14½-ft. high. The two footpaths in each subway have a width of 4-ft. 7-in. each, and the roadway between them is 6-ft. 4-in. wide.

Each subway consists of two terminal sections and one middle section. The former have a gradient of 1 in 100, whilst the

The Port of Hamburg



One of the Ten Timber Storage Sheds at Hachmannkai.



The New Double-storey No. 24 Fruit Shed, Versmannkai, the first to be equipped with a Ventilation Plant in addition to the usual Central Heating Installation.



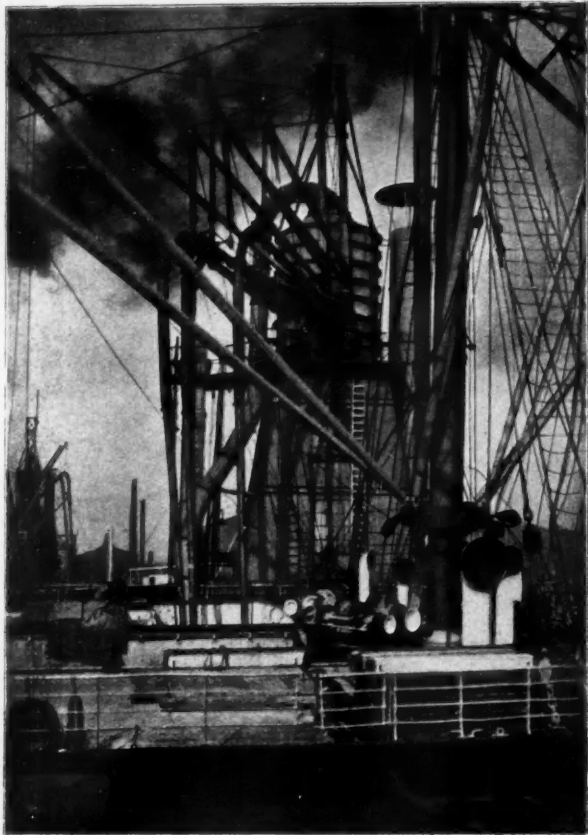
The Latest Quay Shed, the first to be built of Reinforced Concrete, in course of Erection (Shed No. 59, Sudwesthafen).



The Storage Tanks 1,750,000 tons of Oil are discharged in Petroleumhafen annually. The Storage Tanks have a capacity of 409,500 cubic metres.

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latter is horizontal and has a length of 355-ft. The lower edge of each subway lies 72-ft. (the roadway 69-ft.) below M.H.W. and 77-ft. below road level. The thickness of the layer of soil between the river bed and the top edge of the subways is 18-ft., but the depth of the river can be safely increased by another 8-ft. (providing a total depth of 42½-ft. below M.H.W.) without impairing in any way the safety of the tunnel.



The Suction Pipes of a Grain Elevator entering the Hold of a Steamer.

As the weight of the tunnel construction is less than that of water, it follows that the subways would possess a considerable buoyancy and would be liable to deflection unless provision was made for additional load. This was done through an increase in the weight of each yard run by the addition of 1.85 tons of pig iron, so that the specific gravity of the whole construction is now 1.01. Consequently the subways are held approximately balanced, except that they exert a slight pressure on the ground below.

The shafts and subways are faced with glazed earthenware slabs and decorated with sculptural ornaments. The whole of the interior of the tunnel is brightly illuminated by means of incandescent light.

It goes without saying that every possible precaution has been taken to ensure the absolute safety of the working of the tunnel. As a matter of fact, no dislocation or accident has taken place in it during the whole of the twenty years it has been in use.

The improvements aimed at by building the tunnel have been completely realised. When pedestrian traffic is very heavy, the tunnel is closed for vehicular traffic. Five hundred persons can then be carried by the six elevators simultaneously. At certain times—when the ferry-boat services have to be temporarily stopped on account of ice or dense fog—more than 70,000 persons a day can make use of the tunnel. A motor-car only requires two or three minutes to pass through the tunnel.

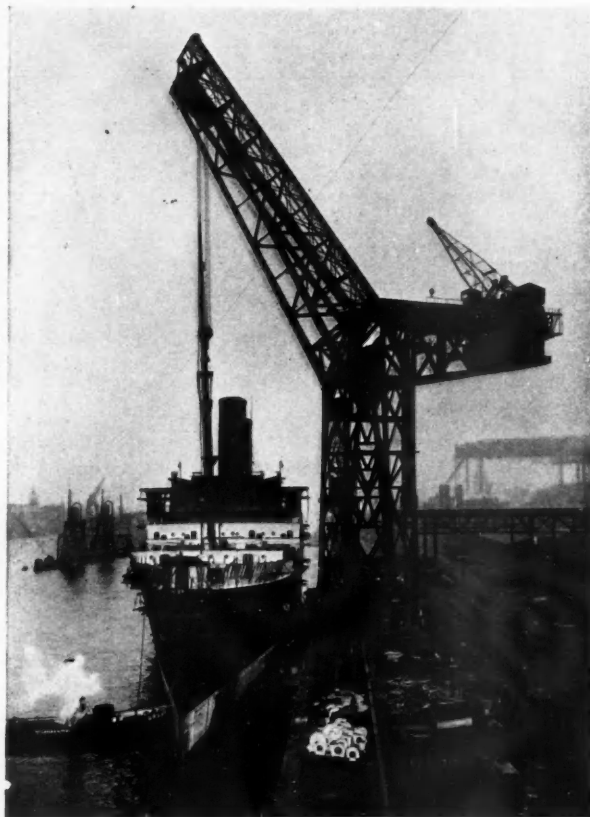
The work was started on July 22nd, 1907, and the completed tunnel was opened to traffic on November 30th, 1911. The expenditure incurred by its construction amounted to 10.7 million marks. Pedestrians use it free of charge, whilst vehicles have to pay a small fee according to a fixed scale of charges.

The Elbe Tunnel being an engineering achievement of more than ordinary interest, a few brief data concerning its construction may perhaps be welcome. The preliminary conditions under which the work had to be carried out were entirely different at the two sides of the river. The clay on the St. Pauli side could be worked in a comparatively simple manner by open cut and with the aid of drainage, but the construction of the Steinwärder shaft and the subways necessitated the use of compressed air.

Before the St. Pauli shaft could be built an annular concrete coffer-dam had to be constructed in order to collect the water contents of the marl. Within it, a hole 8½-ft. wide and likewise shaped like a ring was dug to the depth of the shaft bottom, and the cylindrical shaft wall was built inside, starting from below. When this was completed the central core of soil was removed, and the shaft bottom in the shape of an inverted vault was built-in.

Much more difficult was the construction of the Steinwärder shaft. Its walling consists of reinforced concrete encased by sheet iron lining. This enormous massive cylinder was sunk, with the aid of compressed-air methods, into the working space below, which was 33½-ft. high, the construction of the reinforced concrete body coinciding, in its various phases, with the sinking of the shaft. The top part of the working space, after the subsoil-water bearing stratum had been reached, was closed in by a very strong caisson ceiling, so that it floated in the soil like a bell resting on the compressed air which, at the same time, had to prevent the water pressing from below from entering the working space. In proportion as the soil in the working space (access to which was effected by air locks) was excavated and conveyed upward by the locks, the shaft, vertically guided in a wooden framework, kept sinking until it had reached the required level. Then the bottom was built-in in the same way as that of the other shaft.

Next, the two tubes for the subways were driven forward underneath the river bed, starting from the Steinwärder shaft and working in the direction of the St. Pauli side. For this work, too, compressed air was used. A cylindrical shield, made to encase the part of the tunnel wall already completed, was forced by hydraulic pressure to move forward in the direction of the former in proportion as the soil was excavated in front of it. In this way the work always progressed at the rate of about five feet a day. Two additional rings were always added after each advance of the shield. The compressed air which there, too, had to prevent the water from entering the working space, was at first kept out by the caisson ceiling of the shaft, and afterwards by solid partitions inserted in the tube. The partitions contained the air locks for the material and the workmen.



The 250-ton Dock Crane (the largest Crane in the Port of Hamburg) installing a Ship's Mast.

When the two tubes had reached the St. Pauli shaft, its wall was pierced, and the tunnel was completed in the usual way after first blowing out the compressed air.

Historical Development of the Port

From the Earliest Times to the Completion of the First Quay (1866).

Although Hamburg is already mentioned during the reign of the Emperor Charlemagne as a fortified place,

The Port of Hamburg—continued

her civic development as a single corporative unit did not commence until 1216. A charter issued by the Emperor Frederick Barbarossa granted her valuable privileges in connection with the navigation of the Elbe. She emerged victoriously from the frequent war-like entanglements with her powerful and jealous neighbours, the Kings of Denmark, and kept herself aloof from the troubles caused by the Thirty Years' War. Thanks to these circumstances and to her membership of the Hanseatic League, she was able—from the time of the 12th century onward—to build up for herself a powerful position in the overseas trade of the European nations. There were but few other towns which, as early as the medieval period, could claim a similar position. Those who know something of the city's eventful history may think it strange that the first harbour projects of any importance date from so late a period as the middle of the 18th century. True, the foundation for the subsequent enormous development of her port was laid at an earlier time by the acquisition of large tracts of suitable land on both sides of the Elbe; but until then the mouth of the Alster (near which the older parts of the town grew up) and the roadstead of the Elbe (which river the city's hydraulic engineers had diverted in the 14th, 15th and 16th centuries, by skilfully altering its course, close to the actual city) had been found sufficient for the

Binnenhafen which began to be used by ships after the provision available in the latter basin had proved no longer sufficient.

The names Niederhafen and Oberhafen have been retained until the present day. For centuries the basin described by the former constituted the principal part of the Port of Hamburg. Its adaptation to the growing traffic needs was the main object of all harbour improvement schemes up to the nineteenth century. The ramparts constructed during the Thirty Years' War gave it its definite size and shape. Its western limit was the bastion called Johannisbollwerk, which projected far into the main river, and whose name is still preserved in that of the modern shore road. Its eastern end was the Hölzern Wambs bastion, an advanced work likewise projecting far into the river, but from the western extremity of the Grasbrook island. Two rows of palisades extending from one bastion to the other separated the Niederhafen from the river, except for the double entrance midway between them, which could be closed by the new Niederbaum, a floating boom consisting of two parts. The older Niederbaum above referred to, between Baumwall and Kehr-wiederspitz, was done away with. A blockhouse built into the water and connected with the Hölzern Wambs by the Neptunsbrücke protected the harbour entrance. It was also used for collecting the excise.



Indiahafen, Hansahafen and Segelschiffhafen. In the foreground, part of the Hamburg-Sud Shunting Station, Free Port Area.

needs of shipping. Thus it came to pass that, generally speaking, the history of the Port of Hamburg as such does not commence until 600 years after that of the city's sea-going shipping trade, which had already connected her for centuries with the North, West and South European countries.

The city's first harbour consisted of nothing but the wide S-shaped Nikolaiflet which was originally the lower course of the Alster, together with the narrow canals (Fleete) branching off from it. Gradually the provision for ships' berths was extended to the southern edge of the city and to the outer roadstead opposite the mouth of the Alster, which, on the whole, corresponds to the present Inner Harbour or Binnenhafen. This part only became an "inner" harbour during the fifteenth century when part of the land and water area south of the city was enclosed within the line of fortifications then constructed, the entrance to the basin thus formed being closed by the so-called Niederbaum (the lower boom), a floating boom placed between two groups of piles and serving to block the entrance after traffic hours. Its situation very nearly corresponds with that of the present Niederbaumbrücke at the western extremity of the Binnenhafen. From there the line of ramparts extended along the southern edge of the city, where it was protected by a cut practically corresponding with the present Zollcanal. This ancient cut, which was navigable for barge traffic, had been extended in an easterly direction up to the mouth of the River Bille as early as 1258, and linked up up-river traffic with the Binnen-Hafen, where the sea-going vessels were berthed. In later times it served to connect the Oberhafen or Upper Harbour (near the eastern edge of the city) and the Niederhafen or Lower Harbour, i.e., the roadstead outside the

A narrow strip of the Grosser Grasbrook, the spacious island just south of the city, was included with the system of fortifications built during the Thirty Years' War, and was separated from the remainder of the island by a non-navigable water-course provided with locks. Thus the Kehr-wieder-Wandrahm island, now occupied by the warehouses of the Freihafen-Lagerhaus-Gesellschaft and the Sandthorquai pier sheds, etc., was formed between the old and the new ramparts. The watercourse just described became, at a much later period, the nucleus of the present Sandthorhafen. Its eastern entrance, at the Oberhafen end, was protected by another powerful advanced work, the Bastion Ericus, whose name has been kept alive in that of the present Ericusgraben.

For about a century, i.e., until the middle of the eighteenth century, the Niederhafen, as just described, was found sufficient for the needs of shipping. In course of time, however, the water space available within the Niederbaum became inadequate, the vessels frequenting it gradually increasing in size and in numbers. Once more part of the open river had to be added to the harbour and to be protected in the usual way. In 1767 Ernst Georg Sonnin, who had built St. Michael's Church and who was a recognised authority on hydraulic engineering as well, submitted a scheme for the extension of the Niederhafen. It provided for the construction of a row of dolphins about 1,800 feet long with floating booms outside, and for increasing the depth of the part thus separated from the main stream. The dolphins were also to be used by the sea-going vessels for making fast. The ends of the row of dolphins were located in front of the two harbour bastions. The water within the area thus enclosed was comparatively calm. The scheme was adopted, and in

The Port of Hamburg—continued

1795 a second row of dolphins was added still further outside. It was nearly twice as long as the earlier one, and extended in a westerly direction beyond Johannissbollwerk as far as the Bastion Jonas. The latter was situated at the foot of the rising ground now occupied by the Deutsche Seewarte and the Navigationsschule, but in those days also protected by strong fortifications, viz., the so-called Hornwerk and the Bastion Albertus. The outer Niederhafen was about 3,300 feet long and, on an average, about 400 feet wide. At that time the two names, Rummelhafen and Jonashafen, sprang up to describe the eastern and western portions respectively into which the whole basin was divided by the Johannissbollwerk.



View from the Platform of the new No. 83 Quay Shed, showing its highly-developed Crane Equipment. Imported Logs are transhipped to Railroad Trucks.

Such was the condition of the harbour during the next fifty years or so. Loading and discharging operations were conducted in such a way that the large sea-going vessels were handled outside the Niederbaum, where they were either lying at anchor or made fast to the two rows of dolphins, whereas the smaller ships passed through the entrance that led to the inner Niederhafen and the Binnenhafen, and there took up their berths. The vessels had no contact with the shore in any way. The cargo to be discharged was transferred to small harbour-craft by which it was conveyed ashore and to the warehouses of the merchants. The consignments for exportation were taken aboard in the same way. At that time, therefore, and right up to the 'sixties of the past century, the only method of transshipment employed was what is now called "midstream" transshipment.

The increasing use made of the main river for harbour purposes just described naturally suggested the desirability of making use of the full width of the river. Unfortunately, the opposite bank—which also seemed very suitable for industrial sites—belonged to Denmark. Its acquisition by Hamburg, however, was facilitated by the financial troubles of that country, and a treaty, the Treaty of Gottorp, was concluded on May 27th, 1768, largely through the intermediary of the Duke of Holstein-Gottorp, by which Denmark, in return for valuable financial assistance on the part of Hamburg, ceded to the latter the islands and districts on the left bank of the Elbe, viz., Kaltehofe, Peute, Muggenburger Veddel, Schuhmacherwärd, Steinwärd, Grevenhof, Kuhwärd, Ellerholz, Maakenwärd, Mühlenwärd, Griesenwärd, Park, Pagensand, Flethsand, Dradenau, and part of Finkenwärd.

This treaty, therefore, may be said to have laid the foundation for the development which made Hamburg a seaport of world-wide associations. It was, however, of considerable importance in another respect, too, inasmuch as it led—again through the intermediary of Holstein—to an agreement between Hamburg and the Emperor that confirmed the status of the former as a free city of the Empire with full sovereign rights. For more than two hundred years she had endeavoured to have this matter settled, but Denmark had persistently prevented it.

The trade connections of the new city state underwent a welcome extension during the following period. This development was hastened by political events, such as the American War of Independence, in consequence of which, from 1780 onwards, the United States and the West Indies were thrown open to the Hamburg trading firms because of the neutrality maintained by their city, and the revolutionary disorders in France through which shipping was deviated from French ports to Hamburg. After the French conquest of the Netherlands in 1795 the Dutch shipping trade was similarly deviated to Hamburg. The Eider Canal, constructed at that time by Denmark, gave Hamburg a valuable connection with the countries of North-Eastern Europe. About 1800 there was no Continental city that could rival Hamburg as a centre of international traffic.

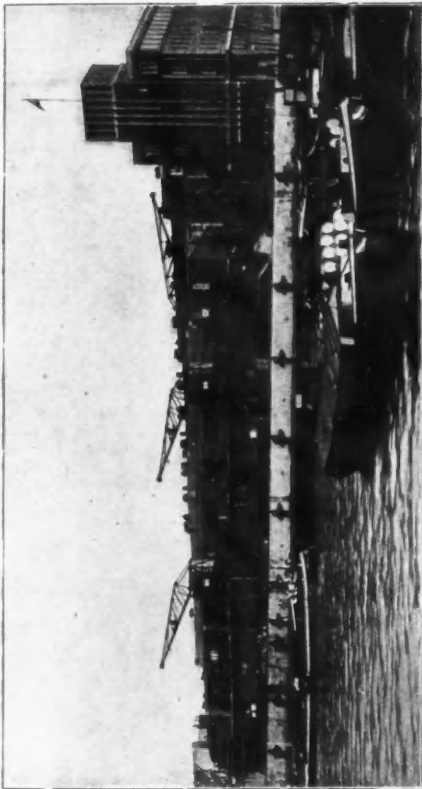
The further enlargement of the harbour, however, was delayed for a considerable time owing to the rise of a new problem facing the authorities. In 1791 and 1792 the low-lying districts of the city were twice inundated, and an immense damage was done. Several schemes were prepared by which provision was to be made to prevent the recurrence of similar disasters, the most important among them being that submitted by Professor Büsch in 1793. Büsch enjoyed a high reputation both as a naturalist and as a political economist. His suggestion was that the two openings in the rampart by which the high water could enter the Niederhafen and the Oberhafen should be dammed up and be replaced by locks that were to be closed when an exceptionally high tide was expected, and were to be open at other times. These restrictions of harbour traffic, however, were distasteful to the trading and shipping community. The modification of Professor Büsch's project, in its technical aspects, by Reinhold Woltmann, the subsequent Director of Hydraulic Engineering (Wasserbaudirektor), likewise failed to find general acceptance. It was not until after the Great Fire of 1842 that it was finally dropped, and that a different solution of the problem presented itself, viz., by levelling-up of the parts destroyed by the fire in so far as they were exposed to the danger of inundations.

All harbour improvement schemes, however, and, indeed, all trading and shipping intercourse with other ports, came to a sudden stop in November, 1806, when Hamburg was occupied by Napoleon. This step was really directed against Great Britain, because Napoleon took the view, and rightly so, that Hamburg was one of the main centres of Britain's foreign trade. The Continental system, a further step in the same direction, eliminated Hamburg as a trading emporium for years, and the years from 1806 to 1815 are represented by a blank page in the history of the Port of Hamburg. Even after the hour of deliverance—which, as far as Hamburg was concerned, struck in May, 1814—the prospects of re-building the lost merchant fleet, of re-opening the former business connections, and of re-starting the local industries were almost hopeless.

Soon, however, several changes took place in the economic relations of various nations which could not but favourably affect the work of reconstruction taken in hand by Hamburg. About 1810 the Spanish and Portuguese colonies in South America began to feel restless and to rise against their respective mother countries. Somewhat later Great Britain, following the general trend of development, threw her own colonies open to international trade. It goes without saying that Hamburg was one of the first ports to establish direct communication between Central Europe and those overseas countries. Numerous Hamburg firms set up branches abroad, especially in the new republics that had sprung up in South America, and the trading relations with North and Central America, with Africa, the Far East, and the Pacific countries and islands were largely extended. The foreign settlements of Hamburg firms were, indeed, the forerunners of German colonisation, and their foundation was followed up by new commercial treaties. Those years, indeed, witnessed the rise of Hamburg to the rank of a seaport whose trading associations reached to every part of the globe. The shipping business improved hand in hand with the growth of foreign trade. The gradual replacement of the sailing vessel by the steamship gave a new impulse to the whole development. The first steamer, an English one, arrived in Hamburg in 1816, but it was not until 1825 that the uninterrupted development of steamer traffic in the Port of Hamburg really set in, and the first Hamburg steamship-owning concern, the firm of Robert M. Sloman, was not founded until 1840. The Hamburg - Amerikanische Packetfahrt - Actiengesellschaft (Hamburg-Amerika Linie), founded in 1847, started their services by means of sailing vessels, but soon afterwards changed over to steamship operation. This is not the place to give a detailed account of the great development initiated in those days, and it must be sufficient to describe the enhanced demands made on the efficiency of the Port of Hamburg between the 'twenties and 'forties of the past century.

Those were the days of the Grasbrook schemes. The Grasbrook island was the area really mapped out for harbour

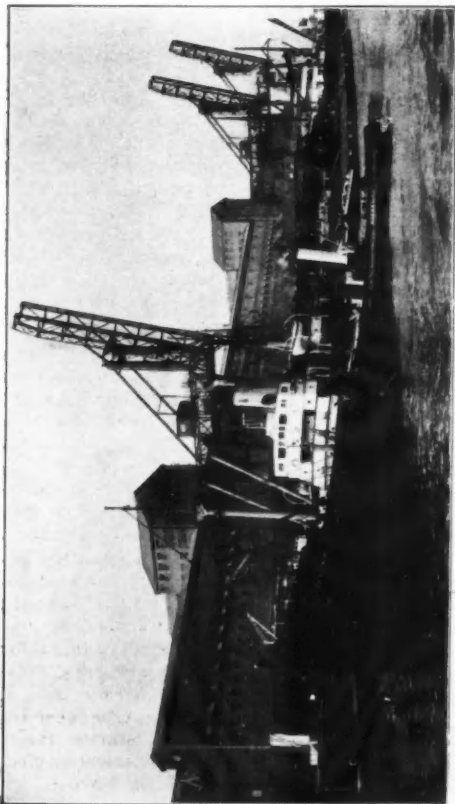
The Port of Hamburg



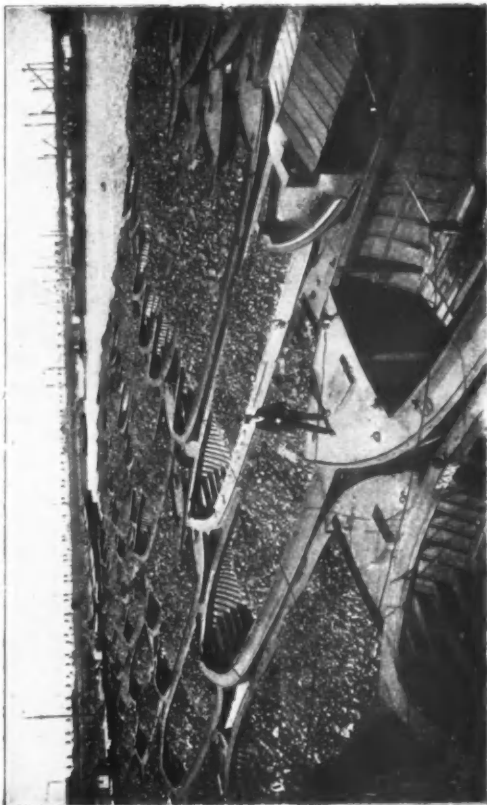
Sheds on Oberhafenkanal.



Further Extension of Waltershof. Filling-up the Area behind the newly-built Quay Wall of Burchardkai, Waltershofer Hofen. On the left, the new Griesewarder Hofen during the now completed period of construction.



View of the Harbour Area jointly administered by Hamburg and Prussia. The Potash Transshipment Plant, Reiherstiegshafen, containing Storage Space for 125,000 tons of Potash.



A Floating Coal Storage Place, Traveshafen.

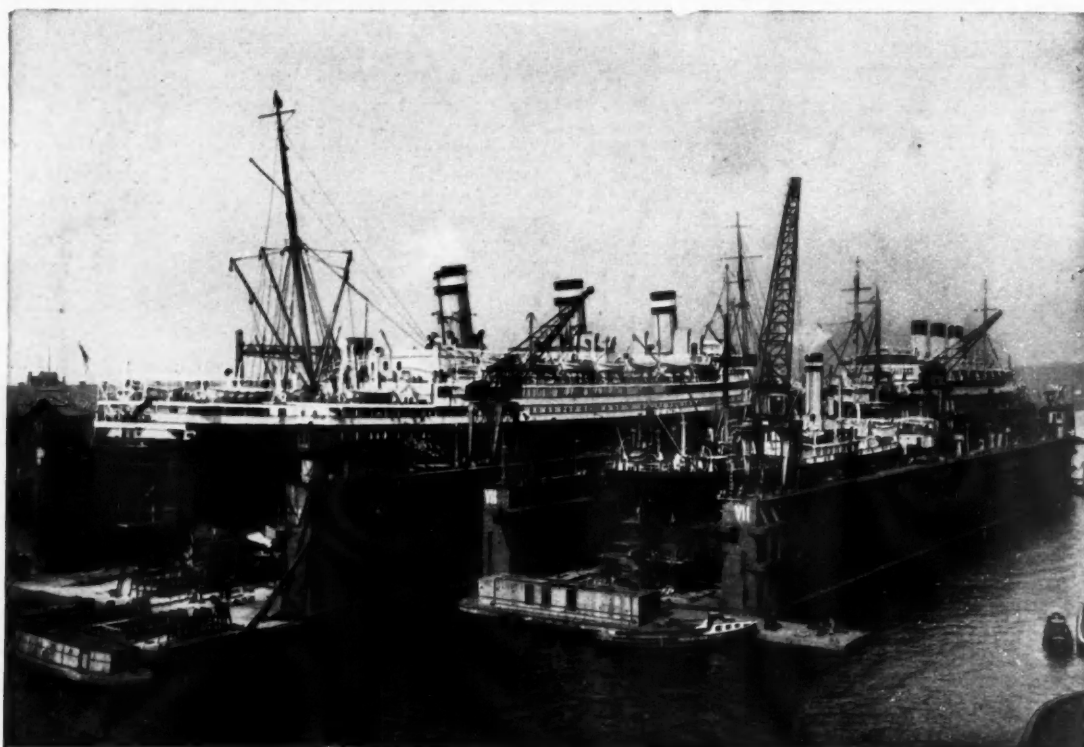
The Port of Hamburg—continued

improvements, even though the immediate object aimed at was the extension of the Niederhafen.

Reinhold Woltmann, since 1814 the head of the Harbour Construction Board (Hafenbaubehörde), just created in connection with the general reorganisation of State administration, submitted his first Grasbrook scheme in 1828. It provided for the demolition of the fortification works still extant (a beginning of such demolition had been made as early as 1804), the intersection of the island by canals and roads, and the building of a large warehouse town also containing office blocks and dwelling houses. It also included the dyking proposals he had elaborated in connection with the Büsch scheme. The House of Burgesses rightly foresaw that the Grosser Grasbrook, the only area on the cityward bank of the Elbe that was still unbuilt upon, ought to be kept available for purposes of still greater importance to shipping, and refused to sanction the proposition.

basin harbour?" confronted the authorities. For more than twenty years this problem formed the subject of lively discussions. The proposals submitted by Vignoles were turned down at that time without much debate, Woltmann, shortly before his death, having strongly recommended their rejection.

Woltmann's successor was Heinrich Hübbe. During his tenure of office the improvement of the harbour conditions, after an interval of almost fifty years, was taken in hand once more. The Johannisbollwerk was definitely demolished in 1848 and was replaced by the first massive shore wall. Lower down the river the first St. Pauli Landing Stages, a simple wooden structure, were built. The Niederhafen was widened and its depth was increased to keep pace with the increased measurements of vessels. Woltmann's proposal concerning the old Stadtgraben was carried out, and the western portion of the present Sandthorhafen was constructed. The funds required



Nos. V, VI and VII Floating Docks, where the S.S. "Reliance" and "Kiel" of the Hamburg-Amerika Line and the S.S. "Cap Polonio" of the Hamburg-Amerikanische D.G., are docked.

Once more, viz., in 1825, an unusually high tide caused heavy damage to the city, and once more (1833) the Büsch-Woltmann dyking and locking scheme came up for very serious discussion. The House of Burgesses, however, again refused its consent, and the fate of the Grasbrook island continued to remain uncertain. Woltmann, therefore, devoted his immediate attention to the question of how to enlarge the Niederhafen. He proposed that the Johannisbollwerk and the block-house—both of which greatly obstructed traffic—should be demolished, that the palisades should be removed to a position nearer the shore, and that the harbour should be deepened. His 1835 project is of fundamental importance to the later developments in that it provided for the demolition of the bastions still guarding the Stadtgraben and for the widening of the latter, i.e., its conversion into a regular harbour basin. This was the first time that expression was given to the idea that was subsequently realised by the construction of the Sandthorhafen, and that contained in embryo shape the principle on which the entire future development of the Port of Hamburg was based. Woltmann also recommended that the projected basin should be provided with quay walls, warehouses and cranes. He was, indeed, the first to demand, in clear and unmistakable language, that properly equipped quays should be built.

The House of Burgesses, before committing itself definitely, desired to profit from the experience gained by British port authorities in regard to harbour construction. Acting upon the suggestion of this body, the City Council immediately invited Charles Vignoles, a prominent British engineer, to proceed to Hamburg. His 1836 project incorporated many of Woltmann's ideas and contained proposals concerning the definite fate of the whole of the Grasbrook island. His suggestion was that the whole of this district should be used for the construction of a number of small curved harbour basins communicating with each other and with the Elbe by means of locks. It was the first time that the fateful question: "Dock harbour or open-

for these improvements were borrowed, this being the first harbour loan raised by the city (1838).

After that, the work that had been started was once more interrupted in order to give a foreign expert an opportunity to express his opinion on it. This was Mentz, a Dutch hydraulic architect, who approved of Hübbe's proposals, so that these were immediately carried out (1840). Mentz, however, exceeded the terms of his commission, and submitted a complete scheme for dealing with the Grasbrook island, based on the same principles as that previously prepared by Vignoles, but it was likewise rejected by the authorities.

Hübbe, whose authority had gained from the opinion expressed by the Dutch expert, continued to pursue his investigation of the Grasbrook problem. Two British experts, William Lindley and James Walker, were appointed by the City Council to assist him in drawing up a report. This latter was jointly issued by the three men in 1845 and has acquired a certain amount of celebrity. It is not difficult to trace in it the rough outline of the later Sandthorhafen, Grasbrookhafen, and Magdeburger Hafen. Credit for this part of the proposals is due to Hübbe. The chief addition made by the two English experts consisted in the provision of locks by which the basins were to communicate with the Elbe. Although Hübbe, by his signature, sanctioned this latter proposal, he did so against his real conviction. A valuable feature of the project was the provision of railway connection for the quays. Such connection was possible because in 1844 the line to Berlin had been opened, and through it Hamburg had been linked up with the railroad system of her hinterland.

This scheme, however, also failed to secure adoption, and it must be admitted that, despite several valuable features it contained, its rejection was a gain to the Port of Hamburg. The feeling against the adoption of the dock harbour principle continued to be as strong as ever. The result was a deadlock, and no further progress was made for some time in the

The Port of Hamburg—continued

development of the harbour. It is true that, in the early 'fifties, the last remnant of the mediæval ramparts, the Hölzer Wambs, was demolished, and that the disappearance of the palisades, together with that of the boom and the blockhouse, gave the Niederhafen a somewhat more modern aspect, but the policy pursued in the Grasbrook area was anything but far-sighted.

The creator of the modern Port of Hamburg is Johannes Dalmann. He definitely settled the protracted controversy between the advocates of the dock harbour and those of the open-basin harbour by rejecting the former principle and adopting the latter.

construction of Oberhafen Canal, from a place below to a place above the new bridge. The former island of Baakenwärder was joined to the mainland near the northern end of the bridge, so that the harbour basin called Baakenhafen was formed. It was originally used by rivercraft only, and its completion took place at a later date. Brookthorhafen, Deichhafen, and Billhafen were also constructed during the same period.

In proportion as the rail-borne traffic expanded, the demands on quay space also increased. The harbour bank facing Sandthorquai was suitably developed from 1869 to 1872. It was called Kaiserquai and is the first quay provided with a solid quay wall.



Grain-carrying Ships are discharged in Waltershofer Hafen with the aid of Elevators. Annual Shipments about 3,000,000 tons.

In 1858 Dalmann, together with the Prussian expert Hagen, who shared his views, submitted to the authorities a carefully thought-out project which was approved by all the public and private bodies concerned. In 1862 he was in a position to start the construction of Sandthorquai, the first quay built in the Port of Hamburg. Before that time it had never been possible in Hamburg to discharge the ships' cargoes, with the aid of portable cranes, on harbour banks strengthened by protecting walls, to convey them to spacious quay sheds, and to re-forward them by rail, cart or up-river barge to their final destinations. By making these provisions, Hamburg freed herself from the tackles of mediæval tradition, and took the first step on the road that led to her development as a port of international importance. The first steamers to use the new quay arrived on August 15th, 1866, and the State administration of the quays (Kaiverwaltung) which Hamburg, likewise in accordance with Dalmann's suggestion, had decided to adopt—was established simultaneously. The year 1866, therefore, decisively affected the development of the Port of Hamburg.

From the Foundation of the United German Empire to the World War.

Once the principle of the dock harbour had been ultimately rejected and a perfect model for the entire future development had been provided by the construction of Sandthorquai, the further advance was rapid and uninterrupted, except for the set-back caused by the world war.

Shortly after the completion of the first quay, communication between Hamburg and her hinterland was improved through the city being linked up with the Cologne-Minden Railway (Cöln-Mindener Eisenbahn) whose terminus, since 1847, had been at Harburg, by the provision—in 1851—of a ferry for vehicular traffic from the Grasbrook to the opposite bank of the Elbe, whence the main road to Harburg traverses the intervening island of Wilhelmsburg in a perfectly straight line. Between 1868 and 1872, after prolonged deliberations concerning the most suitable site, the first railway bridge was built across the Elbe, and in connection with it the Hannoverscher Bahnhof. The entrance to the Oberhafen was removed, by the

The name "Kaiserquai" is reminiscent of an event that had just taken place, viz., the foundation of the united German Empire under William the First. After the dark days of the Napoleonic régime Hamburg gradually abandoned her policy of isolation and of neutrality which, until then, she had steadfastly pursued, and at the time of the establishment of the North German Confederation she threw in her lot with the latter. It was not, however, until the foundation of the united German State that she obtained the powerful support that enabled her to compete with her rivals in the markets of the world. The development of her port, therefore, was very materially affected by the great political events of 1871.

Simultaneously with the construction of the Kaiserquai the second of the basins on the Grasbrook was completed. It was called Grasbrookhafen after the name of the island that had been the object of so much controversy. By giving the name of Dalmannquai to its northern bank an honour was conferred on the builder of the whole group of harbour basins. During the same year (1872) Schiffbauerschaft was opened to traffic.

At that time the southern shore of the Elbe also began to acquire more importance for the purposes of the port. The first basin to be constructed on that side was the old Petroleumhafen (now called Südwesthafen), on which work was started in 1869. The levelling-up and development of Steinwärder proceeded apace, and a number of industrial concerns began to settle on both sides of the mouth of the Reiherstieg. Further east a number of spacious basins of shallow depth were constructed for the accommodation of the rafts of timber to take the place of the timber basins on the northern bank of the river where room was urgently required for additional facilities of a different kind. In other respects the left bank remained unaltered for some time to come.

On the right bank the construction of Dalmannquai was followed up by that of Hübenerquai (Grasbrookhafen) and Strandquai (Strandhafen, facing the main river), but these quays were not then equipped with sheds. The St. Pauli Landing Stages were enlarged in 1868-72, the wooden structure being replaced by an iron construction. In 1875 the first public warehouse, the Kaiserspeicher, was opened to the public.

The Port of Hamburg—continued

Thus far Johannes Dalmann was able to carry out the great work to which his life was devoted. On August 2nd, 1875, death deprived Hamburg of the services of this great man to whom her port owes so much. He was succeeded by Christian Nehls, during whose period of office some of the quay sheds on Hübenerquai (1877) and on Strandquai (1879) were taken over by the State administration of quays, and the wooden shore protections of Sandthorquai were replaced by a massive quay wall.

The early part of the 'eighties witnessed the beginning of a new chapter in the history of the city's economic development. When, in 1871, she joined the German Empire as one of its constituent States, she did not at the same time join the German Customs area. The two city-states of Hamburg and Bremen, faithful to their traditional policy, remained outside of it, because they had all along been staunch upholders of free trade principles and had always firmly opposed protective tariffs. They had held themselves aloof from the movement towards a customs union which sprang up shortly after the days of the Congress of Vienna (1815) and which crystallised, in 1834, in the foundation of such a union. Their special position was recognised when the constitution of the North German Confederation was framed, and the article containing such recognition was also incorporated with the constitution of the German Empire (1871). It provided that "the Hanseatic cities of Hamburg and Bremen, together with such parts of their own and the adjoining territories as are required for the purpose retain their status of free ports and remain outside the customs area until they apply for admission to the German Customs Union." Accordingly, the whole of the Hamburg State territory, the towns of Altona, Wandsbek, and Wilhelmsburg, and

tions. A proper waterway connection—the so-called Zollcanal—was provided between the Niederhafen and the Oberhafen, enabling vessels to proceed from one to the other without the necessity of touching any part of the free-port area. This was accomplished by widening the narrow watercourse of ancient origin separating the Kehr wieder-Wandrahm Island from the southern edge of the city. The island itself was intended to accommodate the warehouses (Freihafen-Lagerhäuser) subsequently to be built. Owing to the density of its population, more than 1,000 dwelling-houses (including those near the fringe of the city and on the southern bank of the river) had to be pulled down, and new residential quarters had to be provided for almost 20,000 persons. A wide main road, properly levelled up so as to be out of the reach of the highest tides, was laid out skirting the edge of the city, and every bridge leading from it to the harbour area was rebuilt. The quay sheds still wanting on Hübenerquai and Strandquai were built, and the work on Magdeburger Hafen and Baakenhafen was completed. The Collecting Shed (Sammelschuppen) was built on the east side of the former, and Sheds Nos. 22 to 25 on Versmannquai (Baakenhafen). Owing to the necessity of continuing in a westerly direction, the waterway of which the Zollcanal forms the main part, the Niederhafen could no longer be used as berthing accommodation for sailing ships. A new basin for these vessels (Segelschiffhafen) was therefore constructed (completed in 1888) on the left bank of the river. Its completion took place by instalments, and quay facilities were at first provided on Amerikaquai only (Sheds Nos. 38 to 40). Moldauhafen (1887) and Saalehafen (1888), two basins with barge-depth, were also constructed at that time. A second bridge was built across the Elbe in order to establish road communications with the new harbour areas. The whole of the free port was separated from the remaining parts of the harbour in the manner described elsewhere, and the various customs stations were provided in conformity with requirements.

Building activities in the Port of Hamburg by no means ceased when the city's incorporation with the Customs Union had been effected in 1888, because the predicted increase in trade and traffic took place even more rapidly than it had been expected. In 1889 the enlargement of the old Petroleumhafen (now Südwesthafen) was accomplished. In 1890 Sheds Nos. 34 to 37 on Asiaquai (Segelschiffhafen), and between 1891 and 1893 the additional quay facilities in Baakenhafen (except the fruit sheds) and on Kirchenpauerquai (except Shed No. 33), became available for

operation. New basins were constructed in quick succession. In 1890 part of Sprechafen was completed, in 1893 Grenzcanal, and in 1895 Hansahafen and Indiahafen. The St. Pauli landing stages were again enlarged, and lower down the water's edge the fish market was laid out.

Christian Nehls, during whose term of office the enormous programme just outlined was carried out, died in 1897. He was succeeded by Max Buchheister.

Buchheister's directorship only lasted for six years. During that period work on the parts east of Reiherstieg was further extended. The fruit sheds on Versmannquai were completed in 1897 and 1899, and Sheds Nos. 41 and 42 on Amerikaquai and Nos. 43 and 44 on O'Swaldquai, as well as the Export Shed No. 1 (Ausfuhrschuppen 1) on Magdeburger Hafen, in 1898. Shed No. 48 (Segelschiffhafen) was added in 1900. Above all, however, these years are notable for the completion (1897/1903) of the huge harbour basins and quays operated by the Hamburg-Amerika Linie, the leading Hamburg steamship-owning company, which was the first shipping undertaking to obtain a lease of State-owned quays (1888). Subsequently, when it became obvious that the Hapag could not very well dispense any longer with a self-contained group of harbour basins, etc., operated by the company itself, the Government had no hesitation in having these facilities built for it at Kuwärder. Thus Kaiser Wilhelm-Hafen, Ellerholzhafen, and Oderhafen—the latter at first only as a basin for rivercraft—were constructed (1902-1903). Kuwärderhafen was built at the same time; its northern bank (Steinwärder Ufer), however, was assigned to the shipyard of Messrs. Blohm and Voss. Its southern bank (Grevenhof-Ufer) was not equipped with quay sheds by the Hamburg-Amerika Linie until 1907. In connection with the basins referred to and the Vorhafen leading up to them, the existing basin for harbour lighters (Schutenhafen) was enlarged (1908) and converted into a coal basin (Kohlenschiffhafen) with its west bank parallel to the mouth of the Köhlbrand as it was at that time. Simultaneously with the big harbour construction works on Kuwärder Sheds Nos. 45 to 47 on O'Swaldquai (Hansahafen) were added (1903).

Buchheister just lived to see the close of this important period of building activity. He died in 1903. His successor as director of hydraulic engineering was Johann Friedrich Bubendey, who enjoyed a high reputation, both as regards the practical and the



Obsolete Quay Installations are modernised to facilitate Transhipment. On the left, view of the former conditions, and on the right, view of the present state.

the whole course of the Lower Elbe were excluded from the customs area, and 120 customs stations were provided along the Lower Elbe. Prince Bismarck—who could not but regard the special position accorded to Hamburg and Bremen as a gap in his work—began, about the end of the 'seventies, to urge upon the two cities the desirability of joining the Customs Union. Public opinion in Hamburg was divided, those in favour of remaining outside being in the majority, although there were others who foresaw that the city, in the long run, was bound to profit from throwing in her lot with her German hinterland which had just started upon an era of great economic progress, and when Bismarck promised that not a mere bonded warehouse district, but a regular free-harbour area (where industrial concerns could settle without any restrictions) should continue to remain outside the customs area, his proposals were accepted. On June 3, 1881, the House of Burgesses passed the necessary legislation and on February 2, 1882, the agreement with the Empire was signed. Besides Hamburg, the Prussian districts above enumerated, including the Lower Elbe, were added to the customs territory. The administration of the customs was entrusted to Hamburg. The national government contributed the sum of 40 million marks to the expenditure incurred through the incorporation of Hamburg with the Customs Union. This is the only contribution it has ever made to the development of the Port of Hamburg.

A committee consisting of Messrs. F. A. Meyer, Zimmermann and Nehls was appointed to draw up a building plan for the whole harbour area so that the customs boundary could be fixed. As far as the districts east of the Köhlbrand are concerned, the line then fixed very nearly coincides with the present boundary, except that a fairly considerable enlargement of the free-port area was effected in the Ross-Neuhof district under the terms of the 1908 Köhlbrand Agreement. The free-port area on Watershof was not added until 1923 and 1928.

The solemn incorporation of Hamburg with the German Customs area took place on October 15th, 1888, and the free port was given over to its intended destination on the same day. Previously, however, a comprehensive building programme had been carried out in the harbour. The principal additions made between 1882 and 1888 are briefly enumerated below.

First of all the Grosser Grasbrook, and especially the Kehr wieder-Wandrahm Island, were subjected to considerable altera-

The Port of Hamburg—continued

theoretical aspects of his subject. He found himself confronted with several important tasks concerning the further improvement of the port and the great work of regulating the course of the Lower Elbe to which reference is made elsewhere. Above all, however, his name is associated with the third Köhlbrand agreement (1908) the conclusion of which decisively affected both undertakings. The chief additions to existing facilities made during his term of office are briefly enumerated in the following account.

In 1905 the conclusion of the lease agreement with the Vulcan-Werke, of Stettin, necessitated the construction of additional harbour basins in the Ross district. As the Vulcan-Werke desired to transfer their chief yard to Hamburg, a suitable site had to be prepared between the old Kohlenschiffhafen and Oderhafen, and the required areas had to be made suitable for launching and equipping the vessels to be built there. Ellerholzhafen, therefore, was enlarged, and west of Oderhafen a new basin, named Rosshafen (completed in 1908), was constructed. The west bank of the latter, now called Hachmannkai, was placed at the disposal of the Vulcan-Werke. Oderhafen and Spreehafen, two of the basins used by rivercraft, were also enlarged, and by the construction of Müggenburger Zollhafen (1909) communication was established with the Peute canals built in the early years of the present century. At the same time Möldauhafen was enlarged, and the shed of the Vereinigte Elbe-

Schiffahrts-Gesellschaften was built on Prager Ufer. The western portion of Grenzcanal was deepened for the accommodation of sea-going vessels. The Rheindienst-Schuppen of the Hamburg-Amerika Linie on Johannishollwerk and the Distributing Shed (Verteilungsschuppen)—now called Export Shed No. II. (Ausfuhrschuppen II.)—near the eastern extremity of Kirchenpauerquai were also completed. The St. Pauli landing stages were rebuilt in their present form and were opened to traffic in 1909. The completion of the Elbe Tunnel in 1911 was the most important improvement affecting of communication between the two banks of the Elbe that had been made since the building of the road bridge across the river. The existing sheds for special purposes, i.e., the Collecting Shed (Sammelschuppen) and Export Shed No. I. (Ausfuhrschuppen I.), were added to by the building of the Distributing Shed already mentioned, of Shed No. 49 (Saalehafen, built 1907), of Fruit Shed "C" (Fruchtschuppen C, built 1911), of the Fruit Shed on Stadtdeich (1912), and of Shed No. 54 (Grenzcanal, 1913). Other buildings completed in the older part of the harbour area before the war include several quay sheds on the peninsula between Hansahafen and Indiahafen (Bremerquai and Australiaquai), Sheds Nos. 2 and 3 on Sandthorquai (replacing the older sheds of those names), and the rivercraft basin on Peute.

(To be continued)

Hull and the Humber

Suggested Tunnel under the River Humber.

THE suggestion of a tunnel under the River Humber between Hull and North Lincolnshire has been revived by the Humber Conservancy Commissioners in a letter to the Board of Trade as the more practical and safe alternative to the construction of a road bridge. The Ministry of Transport, who have been consulted in the matter, however, have intimated that they do not consider it necessary, in view of the rejection of the new proposals of the promoters of the Humber Bridge Bill by the ratepayers to embark upon a detailed examination of the Humber Conservancy's suggestion, save in so far as the Board advocate the construction of a tunnel and draw certain conclusions relative thereto from the report of Sir Douglas Fox and Partners. On this particular aspect of the problem the Ministry point out that the engineer's report, which dealt fully with the various alternatives, was definitely adverse to a tunnel, and estimated the cost thereof (on the assumption that twin tunnels would be constructed) at £7,200,000, as compared with £1,725,000 for a bridge. The Ministry state further that even on the assumption that a single tunnel would suffice at the outset, the cost could hardly be put at less than £4,000,000, to which must be added the interest during the lengthy period of construction, the cost of borings, etc. Moreover, account must be taken of the cost, probably formidable, of ventilation, lighting, etc., as to which the experience gained on the new Mersey Tunnel connecting Liverpool with Birkenhead is in point.

The Humber Conservancy Commissioners, as the authority responsible for the river and its navigable channels, however, have very strong views as to the grave danger that would arise from the piers necessary to carry the bridge over the waterway, and are resolved to oppose the Hull Corporation's Bill by every means in their power when consideration of it is renewed in the coming session of Parliament. It is because of the possibility that this Bill may receive approval that the Humber Conservancy Board regard the time opportune to urge that full consideration should be given to the advantages of a tunnel over those of a bridge. They have been advised that a tunnel could be constructed at a much lower cost than that mentioned by the Ministry of Transport. If, later on, the Bill should be referred to a Parliamentary Committee, the Conservancy Commissioners intimate that they will adduce evidence to prove that a tunnel is a practical proposition and is an alternative which should be carefully examined before the proposed bridge—with all its admitted attendant risks to navigation—is sanctioned. Very strong opposition to the bridge proposal is also forthcoming from Goole, which port, should anything happen detrimental to navigation and the free movement of shipping in the Upper Humber, would stand to be seriously affected. New financial proposals are likely to be produced when the Bill is again in Committee.

Efforts to Reduce Port and Dock Charges at Hull.

The efforts made to reduce port and dock charges on shipping at Hull are being continued. The proposed reduction of pilotage rates by 10 per cent. is being contested by the pilots, who consider that as "piece workers" they have already made

their contribution by reason of their reduced earnings, and that in the past 18 months they have suffered in comparison with others under the authority of the Conservancy Board. The shipowners and the Conservancy Commissioners have, however, intimated to the Board of Trade that their attitude towards any attempt to inflict increased burdens upon the shipping industry must be one of "resolute opposition."

Bridlington Harbour Slipway.

The Bridlington Harbour Commissioners have granted the application of the Air Ministry for a further 250 square yards of land adjoining the present R.A.F. site on the harbour top for the purpose of constructing a slipway into the harbour, subject to its being made 20-ft. wide to enable the motor lifeboat also to be launched from it, as against 12-ft. first mentioned. The Ministry have, however, replied that the need for economy would not permit this, and stated that the proposal was to construct a 12-ft. slipway from the present site. The Royal National Lifeboat Institution are also asking for a site to construct a separate slipway. The fishermen and others who use the harbour are opposed to two separate slipways. It is understood that a joint scheme will be prepared by the Air Ministry and the Lifeboat Institution, and will come before the Commissioners at a later date.

Bridlington Harbour Commissioners.

With reference to a proposed change of venue for the meetings of the Bridlington Harbour Commissioners, the Chairman (Dr. T. C. Jackson) at the last meeting pointed out that the Commissioners are bound by statute to meet at the Britannia Hotel and that before they can meet anywhere else a formal resolution is necessary. Another interesting fact is that the meetings have always been held at the full moon!

Aire and Calder Navigation.

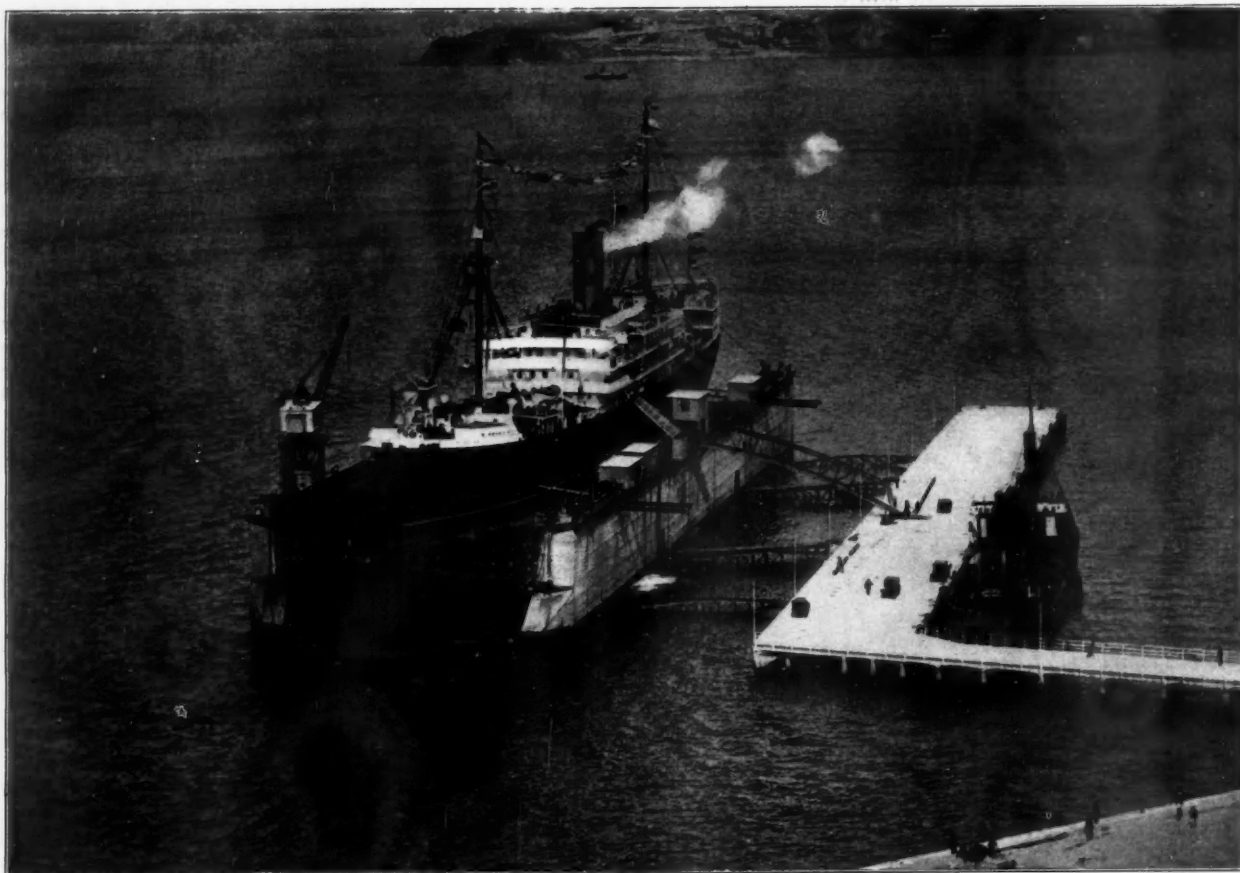
Recent extensions of the canal and lock system of the Aire and Calder Navigation have resulted in the Hatfield Colliery being brought within its scope and its coal sent by canal to Goole for shipment abroad and coastwise. The first cargo of coal from Hatfield to be thus water-borne consisted of 270 tons shipped in the Navigation's compartment boats. The coal was received from the colliery at Bramwith Lock, which is being extended to accommodate a train of compartment boats and the double-headed tug which tows them, and thence via the New Junction Canal, an off-shoot of the Aire and Calder's main system between Goole and the West Riding.

Retirement of Port Official.

Mr. Henry Gill, who has been for many years berthing master at the Goole docks of the Aire and Calder Navigation, has retired and has received a handsome gift subscribed by the dock officials, shipmasters and other friends at Goole. The presentation was made by Captain G. E. Lea, O.B.E., the harbour master. Mr. Gill was appointed an assistant berthing master at Goole in 1906 and was subsequently promoted. A native of Whitby, he sailed as a ship's officer for 25 years in various parts of the world.

Wellington Harbour Board

Floating Dock for the Port of Wellington



Dock Lifting Trial: R.M.S. "Ruahine" (weight 11,200 tons). April 2nd, 1932.

THE floating dock, which is situated in Kaiwarra Bight opposite the northern end of the Thorndon Reclamation, is attached by mooring booms to a reinforced concrete wharf specially built for the purpose.

The wharf is about 589-ft. long by 54-ft. wide, with an approach 23-ft. wide from the shore. It is constructed with reinforced concrete piles driven 10-ft. apart transversely and in tiers about 20-ft. apart longitudinally, with raking piles at intervals. Special clusters of piles, both vertical and raking, are driven to support the heavy concrete construction where the mooring booms of the dock are attached, and to stiffen the wharf against stresses due to wind pressures from the dock.

The superstructure is of reinforced concrete and the deck is finished with a smooth concrete face.

At the foot of the approach an electric sub-station and store is built, from which the electric mains supplying the dock with current are led. These run under the deck of the wharf and are led across one of the mooring booms to the dock. The side of the wharf opposite to that to which the dock is attached is arranged as a repairing berth, and provision is made for electric plugs from which power and light can be led to a vessel alongside. Provision for fresh water and for telephone connections are also provided.

General Description.

The dock, which was built by Messrs. Swan, Hunter and Wigham Richardson, Ltd., of Wallsend-on-Tyne, England, and designed by Messrs. Clark and Standfield, of Westminster, is of the self-docking sectional box type consisting of seven sections, which together are capable of lifting and accommodating a vessel of 17,000 tons displacement. The principal dimensions of the dock are:—

	ft.	in.
Overall length of dock over platforms	584	0
Overall length of dock over pontoon	527	0
Overall width of dock	117	6
Clear width of dock between fenders	88	0
Overall depth of pontoon	14	0
Overall length of side wall	452	0
Overall height of side wall above outer edge of pontoon	35	0
Overall width of side wall at base	16	0
Overall width of side wall at top	11	0
Depth of water over keel blocks	26	0
Corresponding freeboard of side walls	4	3
Height of keel blocks	4	0
Overall length over keel blocks	533	0
Depth of water required at site	46	0

The displacement of the pontoon at 35 cubic feet per ton is 23,700 tons. The gross weight of the dock, including 860 tons of balance water remaining in the pontoon, is 6,700 tons, which with the lifting capacity of 17,000 tons equals 23,700 tons.

The dock is capable of lifting a 10,000-ton vessel in approximately two hours.

Fittings.

KEEL-BLOCKS.—One hundred and sixty-nine keel-blocks are provided, each consisting of two blocks of oak, on top of which are capping pieces of soft wood.

BILGE-BLOCKS.—Thirty-two bilge-blocks (16 on each side) are provided, the lower portions of which are constructed of steel. On top of these are wedge-shaped pieces of pitch pine with hauling in and out chains attached. These chains are carried up to the top of the walls and are operated by small hand winches.

MECHANICAL SIDE STORES.—Four mechanical side stores are provided on each wall for centring vessels over the keel-block. These are moved in and out by means of cast steel pinions gearing into cast steel racks, the pinions being driven by hand through worm and bevel gearing.

ELECTRIC CAPSTANS.—Four electric warping capstans are fitted on top of the wall deck, one at each corner of the dock. They are of the self-contained type consisting of an electric motor driving a cast iron capstan barrel by means of worm and spur gearing. Each is capable of exerting a pull of 5 tons at 50-ft. per minute. Fairleads are provided in front of the capstans.

BOLLARDS.—18-in. cast iron double bollards are provided on the top deck of the walls, one at each end of each wall, and 6-in. cast iron double bollards are provided at each corner of the pontoon deck for mooring small craft alongside. On the top deck of the walls on each side there are single cast iron bollards 14-in. diameter spaced about 75-ft. apart.

GAUGE BOARDS.—At each corner of the dock are fitted gauge boards to indicate the depth of water over the keel blocks.

WATER LEVEL INDICATORS.—Pipes terminating in air bells are led from the bottom of each compartment of the pontoon to the valve house and are connected to water level indicators. These consist of U tubes containing mercury which is balanced at zero and rises as the air pressure increases in the pipes, due to the rise in water level in the pontoon. The mercury shows in a glass tube and the level is indicated on a graduated scale.

Wellington Harbour Board—continued

MOTOR HOUSES.—On the deck of the starboard wall are erected two motor houses, each containing two main pump motors and their gear, a main switchboard house and a valve house. The latter is erected in two storeys, the lower one containing the air-compressors and receivers and their motors for the electro-pneumatic valve control of the dock and for repair tools, also the motor for the fire and wash-down service. The upper storey contains the necessary valve gear for the control of the dock.

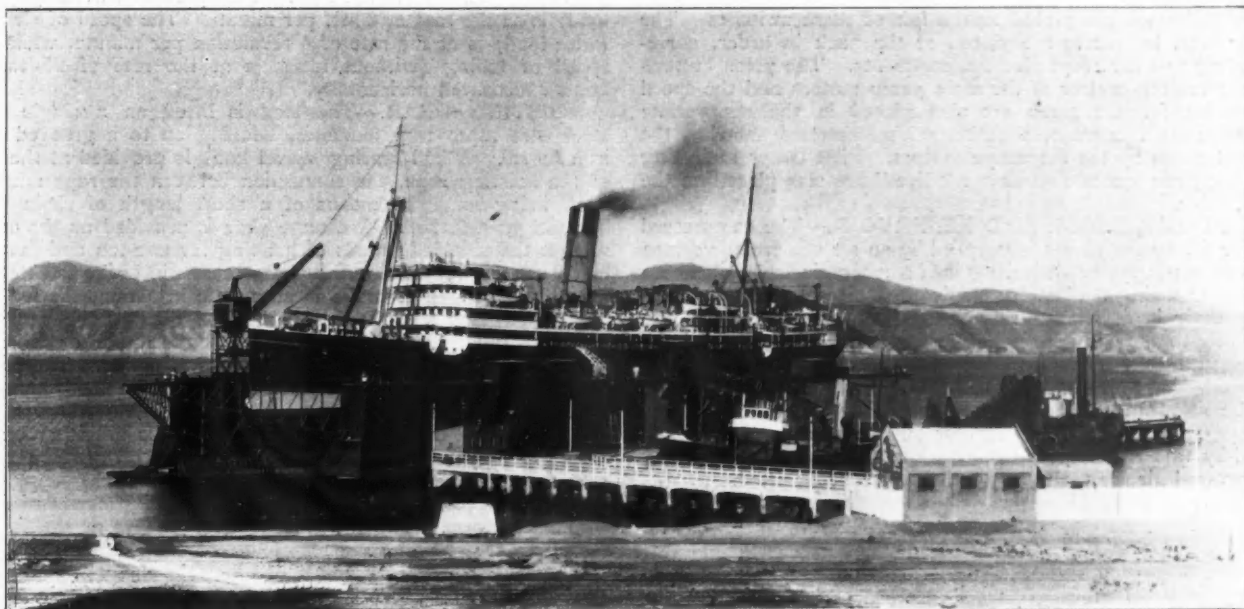
AIR-COMPRESSORS.—An electrically driven air-compressor capable of compressing 300 cubic feet of free air per minute to a pressure of 100 lbs. per square inch is provided in the lower storey of the valve house and is used for supplying air for repairing tools, etc. This plant is provided with a circulating water pump capable of drawing water from the sea 48-ft. below the compressor bed-plate. A suitable air reservoir is also provided. An air compressor plant for lifting the valves is also installed in this house.

a mean head of 17.5-ft. They are also capable of delivering water at a reduced rate against a head of 25.5-ft.

Pipes, Valves and Gear.

PUMP DISCHARGES.—The pump discharge is of cast iron in the form of a cone, the large end of which is bolted to the skin plating of the dock and the other end to a 22-in. screw down cast iron sluice valve which is bushed with gunmetal to all its moving parts. The valve spindle is of steel coupled to a vertical shaft led up to the top of the deck and there furnished with a removable hand wheel supported on a standard. The pump discharge is protected on its seaward side by a rubber-faced automatic flap valve making itself tight against the projecting lip of the discharge pipe, and a chain is led up to the top deck, so that if necessary these flaps can be held open.

MAIN DRAIN AND DISTRIBUTING BRANCHES.—The main drain which runs along the bottom of the pontoon on the starboard side is of cast iron of varying diameters, and is pro-



R.M.S. "Makura" (8,075 tons gross) on Dock for Painting and Overhaul. June, 1932.

AIR MAINS, ETC.—An air main 3-in. in diameter, running the full length of the dock, is attached to the front face of each wall about 3-ft. from the pontoon deck level. These mains are interconnected by a cross-deck main running under the pontoon deck. At intervals of about 60-ft., 1-in. air cocks and strainers are screwed to the mains, to which air hoses can be attached.

BROW.—A brow of lattice construction furnished with hand-rails connects the wall deck to the mooring wharf.

MOORING BOOMS.—The dock is moored transversely by four lattice-work booms, 70-ft. long centre to centre of pins. These booms are attached at each end by universal joints of cast steel, allowing the necessary freedom of movement for the dock. Two of these booms have gangways built over them and allow access to be made from the wharf, through gangway openings, to the dock when raised.

CHAIN MOORINGS.—The dock is moored longitudinally by means of stud link cables attached to concrete mooring blocks at the bow and stern. In addition to this, there are two supplementary transverse cable moorings on the port side.

Shafts, Bearings and Pumps.

COUPLINGS.—The spindle of each of the electric motors is attached to the top of the vertical or pump shaft by means of a flexible coupling, which allows a slight vertical movement, so that the weight of the pump shaft and pump impeller is entirely supported on its own thrust bearing and not in any way hanging on to the motor shaft.

PUMP SHAFTS.—The vertical pump shafts which connect the motor to the pump are of steel. They are each about 42-ft. long and are supported at intervals in gunmetal-lined plummer blocks attached to the internal framing of the dock. The weight of each of these shafts is taken by a ball bearing carried in the iron casting of the motor.

PUMPS.—The four 22-in. centrifugal pumps, which are of the horizontal (vertical spindle) type, are seated directly on top of the main drain running along the bottom of the pontoon. They take their water entirely from the underside and discharge it direct at their own level through the skin plating of the pontoon. Their bodies are of cast iron, the impellers of steel and the spindle of stainless steel. Of the four pumps, two are to the right hand and two to the left. Each of the four pumps are capable of delivering 53 tons of sea water per minute against

provided with expansion joints. From the main drain cast iron distributing branches are taken and led to the various compartments, where they terminate in bell mouths which are bolted to the troughs. The main drain is provided with a separation valve.

INLETS.—Six inlets are provided. They branch out from the main drain at right angles and are each provided with a screw-down gunmetal-faced valve and cone-shaped pipe similar to the discharge valves, and the spindles are likewise led up to the top deck. Each inlet is governed by a flap valve and is further provided with a lever on its face so that it can be operated by means of an electro-pneumatic press on the top deck level controlled from the valve house. The flap valve is similar to the one governing the pump outlet, but has a small relief valve of similar form to facilitate the opening thereof. The opening lever is connected to this relief valve. Each inlet is protected by means of a grid.

DISTRIBUTING VALVES.—Valves are attached to each of the distributing pipe branches. These valves are of the direct lifting type, with double gunmetal ports held apart by springs. The body of the valve is cast iron, gunmetal bushed on the contact surfaces, and with gunmetal glands and stuffing boxes.

The valve rods are led up to underneath the top deck and there attached to the presses of the valve lifting gear. Cast iron weights are fixed at the bottom of each valve rod to ensure the proper closing of the valve.

AIR PIPES.—The inner compartments of the dock are fitted with 2-in. diameter air pipes which run close up under the pontoon deck to the walls and then up to within 6-in. of the top deck.

Control of Dock.

VALVE LIFTING GEAR.—The compartment or distributing valves of the dock and the inlet flap valves are all operated from the starboard wall. For this purpose an electro-pneumatic system has been used. The lifting presses for the valves are operated by compressed air at about 80 lbs. per sq. in., and controlled by means of valves operated by electro-magnets. The electro-magnets are in circuit with a switch in the valve house. While the electro-magnet is excited the valve remains lifted, but the valve rod is so weighted that as soon as the current is cut off by means of the switch on the valve table the air is allowed

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to escape from the press and the valve closes. Each valve rod is attached to the ram of its own press and the valve is arranged to be lifted and closed at the rate of about one inch per second. Electric valve indicators are fitted in the valve house showing whether the valve is open or closed; these are worked by means of a circuit breaker operated by an attachment to the valve rod. A cock is inserted in the air pipe of each press so that the air can be cut off or throttled as may be required. The electromagnetic valves are so arranged that they can be operated by hand should the electric current fail. In addition, means are provided for lifting the valves by hand should the air pressure fail.

VALVE TABLE.—The valve table in the valve house is in the form of a large model of the dock, but made in two halves with a passage between for convenience of access. Each half is divided up to correspond with the compartments and numbered accordingly. On this table, and placed in the space representing the compartments of the dock which they control, the switches actuating the electrical contacts are mounted. The valve indicators are placed to the left of these switches. The water level indicators are placed at the back in order, corresponding to their respective compartments. The press buttons for the remote control of the main pump motors and the speed regulators for the same are also placed in the appropriate positions on this table, together with ammeters showing the current taken by the respective motors. Pilot lamps indicating that the main motor circuits are "live" are also placed on the valve table.

AIR COMPRESSOR AND RESERVOIR.—The compressed air for lifting the valves is supplied by an air compressor driven by an electric motor delivering into a reservoir from whence a single air main is taken to supply the different presses. This compressor is of such a size that it can raise the air in the reservoir to the full pressure in less than 10 minutes and is so arranged that the air pressure starts or stops the motor as required. The size of the reservoir is such that all the valves can be lifted and closed twice in one minute without lowering the pressure too much for further successful operation. As a stand-by this reservoir is connected to the reservoir supplying compressed air for tools, a reducing valve being fitted.

ACCUMULATORS.—Electric current for the valve control gear is provided by a battery of six accumulators in series, of a capacity of 120 ampere hours; these are charged from the lighting mains. On the valve table a switch for cutting off this battery is provided, so that no current will be consumed for indicating the position of the dock valves, except when the attendant operates the same.

SPIRIT LEVELS.—The valve house is fitted with two spirit levels at right angles to each other—one to show the trim or longitudinal tip of the dock and the other the heel or transverse tip. These are about 2-ft. long and are permanently mounted on the valve table.

OPTICAL DEFLECTION INDICATORS.—Optical deflection indicators are fitted in the centre of the dock on the back stage to ascertain the longitudinal deflection. These consist of telescopes firmly fixed horizontally, looking respectively fore and aft to the ends of the dock. At each end of the wall, in line with the axis of the telescope, is erected a tubular steel mast carrying a board 12-in. high and 6-in. wide, which can be adjusted in position. The top and bottom 3-in. of this board is painted red and the middle 6-in. white. Across the centre of the white strip is painted a thin black line. The horizontal hair in each telescope is adjusted on this black line. When the red strip is cut by the horizontal hair it is an indication that the safe deflection of the dock has been exceeded.

FUTURE EXTENSION.—In view of the ultimate extension of the dock by an additional section, all parts of the control plant which would be affected by such extension, such as the receiver and motor for the same, have been given a capacity of 15 per cent. more than would otherwise be required.

Main Pump Motors.

The motors for the main pumps (four in number) are enclosed ventilated drip-proof induction motors of the slip ring type. They are each 100 b.h.p., have 365 revolutions per minute, and are capable of running with a 25 per cent. overload in torque for two hours without undue heating or deterioration of parts. The rotor slip-rings are of bronze supported on a metal bush fixed to the rotor shaft, the rings being insulated with mica. The brush holders are of bronze and the spring of phosphor bronze.

CONTROL.—The pump motors are started and stopped from the valve house by a push-button (remote control) system. For this purpose an automatic starter is provided, for each main pump motor, of the multiple contactor type with interlocking contactors. Suitable relays are provided to control the rate of starting and acceleration. Automatic no-volt and overload releases are also fitted as part of the starter, which is provided with a triple pole isolating switch. Two sets of push-buttons are provided for each motor. One set to start and stop the motor is placed on the control table in the valve house; the other set is mounted on the starter itself. For each motor an

ammeter is fitted on the valve table and also in the motor house. The master controllers for the speed regulation are enclosed. The resistances are of the protected, rustless, unbreakable grid metallic type, liberally rated for continuous duty on any of the speed steps.

Crane.

An electric portal travelling crane of the mast type is installed on the port wall. It is capable of lifting a weight of two tons at a radius of 54-ft. from the centre of the crane and five tons at a radius of 27-ft. The minimum radius is 18-ft. The total vertical range of the crane hook at 54-ft. radius is 90-ft., that is, from 40-ft. below rail level to 50-ft. above rail level.

The clear headway under the portal is 8-ft. 6-in. above rail level and the clear width between the portal legs is 9-ft. The distance apart of the two rails centre to centre is 11-ft.

SPEEDS OF OPERATION.—The hoisting speed is at the rate of 250-ft. per minute with a load of two tons and 100-ft. per minute with a five-ton load. The speed of travelling (with load) is at the rate of 60-ft. per minute. The speed of slewing (with load) is at the rate of $\frac{1}{2}$ revolution per minute, while the speed of luffing (without load) is at the rate of 25-ft. per minute measured horizontally.

HOISTING GEAR.—The load is lifted on a single part steel wire rope, 1-in. diameter, winding on to a grooved cast iron barrel. A ball-bearing swivel hook is provided at the end of the hoisting rope, the connection between the rope and the hook being made by means of a short length of chain with bob weight attached. A change gear is provided on the crane so that the specified speeds of hoisting for two-ton and five-ton loads can be obtained. A 3-phase magnetic brake is fitted to the hoist gear. The brake is automatic in action, the magnet being energised and the brake released directly the motor is started. When current is cut off from the motor or fails for any reason the brake instantly comes into action. The brake is provided with a suitable release so that the loads may be lowered by gravity.

A mechanical brake of the strap type is also provided for the hoist gear, applied by means of a foot lever. A self re-setting type overwinding switch and gear is also provided.

LUFFING GEAR.—The jib is controlled by means of steel wire ropes, $\frac{3}{4}$ -in. diameter, passing over pulleys at the top of the crane frame and from thence to the derrick barrel. The ropes are duplicated, so that if one set fails the second set will hold up the jib. A 3-phase magnetic brake is fitted to the derrick gear, similar to that of the hoisting gear. An automatic mechanical brake of the "Weston" friction disc type is provided, so arranged that it will sustain the jib in any desired position, and that in order to lower the jib the motor must be rotated in the lowering direction. This brake is applied by the load and is equally effective with heavy or light loads.

SLEWING GEAR.—The slewing motion consists of gear reduction from the motor operating the main pinion, which in turn engages with the rack. A slipping device is embodied in the slewing gear to prevent undue stresses on the gear from shocks due to wind, acceleration, etc. Provision is made for locking the revolving part of the crane when not in use. A mechanical brake of the clapper type, operated by a hand lever, is fitted to the slewing gear.

TRAVELLING GEAR.—The travelling gear is operated by a motor situated on the sub-structure and consists of gear reductions driving all the travelling wheels. A 3-phase magnetic brake is fitted to the travelling gear. The wheels of the crane are 8 in number, 2 situated at each corner, arranged with a bogie.

MOTORS.—The crane has four motors, that is, a separate motor for each motion. With the exception of the travelling motor, which is totally enclosed, they are of the enclosed ventilated drip-proof reversing type. They are of the wound rotor type, with slip rings. The particulars of the motors are as follows:—

				B.H.P.	revs. per min.
Hoisting motor	...	...	...	50	590
Luffing motor	...	...	...	6	725
Slewing motor	...	...	...	6	725
Travelling motor	...	...	...	12	725

Delivery.

The dock was towed from England to New Zealand by Messrs. L. Smit and Co.'s International Tug Co. of Rotterdam, leaving Wallsend-on-Tyne on July 15th, 1931, and arriving at Wellington Harbour on December 28th, 1931, after having travelled a distance of approximately 14,000 miles, the world's longest record tow. Two tugs were employed for the whole of the distance with the exception of the English Channel, where a third (additional) tug was used. The route taken was through the Mediterranean Sea, Suez Canal, Aden, Colombo, Sabang, Doerian Strait, Banka Strait, Tandjong Priok, Macassar, Wetter Strait, Torres Strait, inside Great Barrier Reef of Queensland and Tasman Sea.